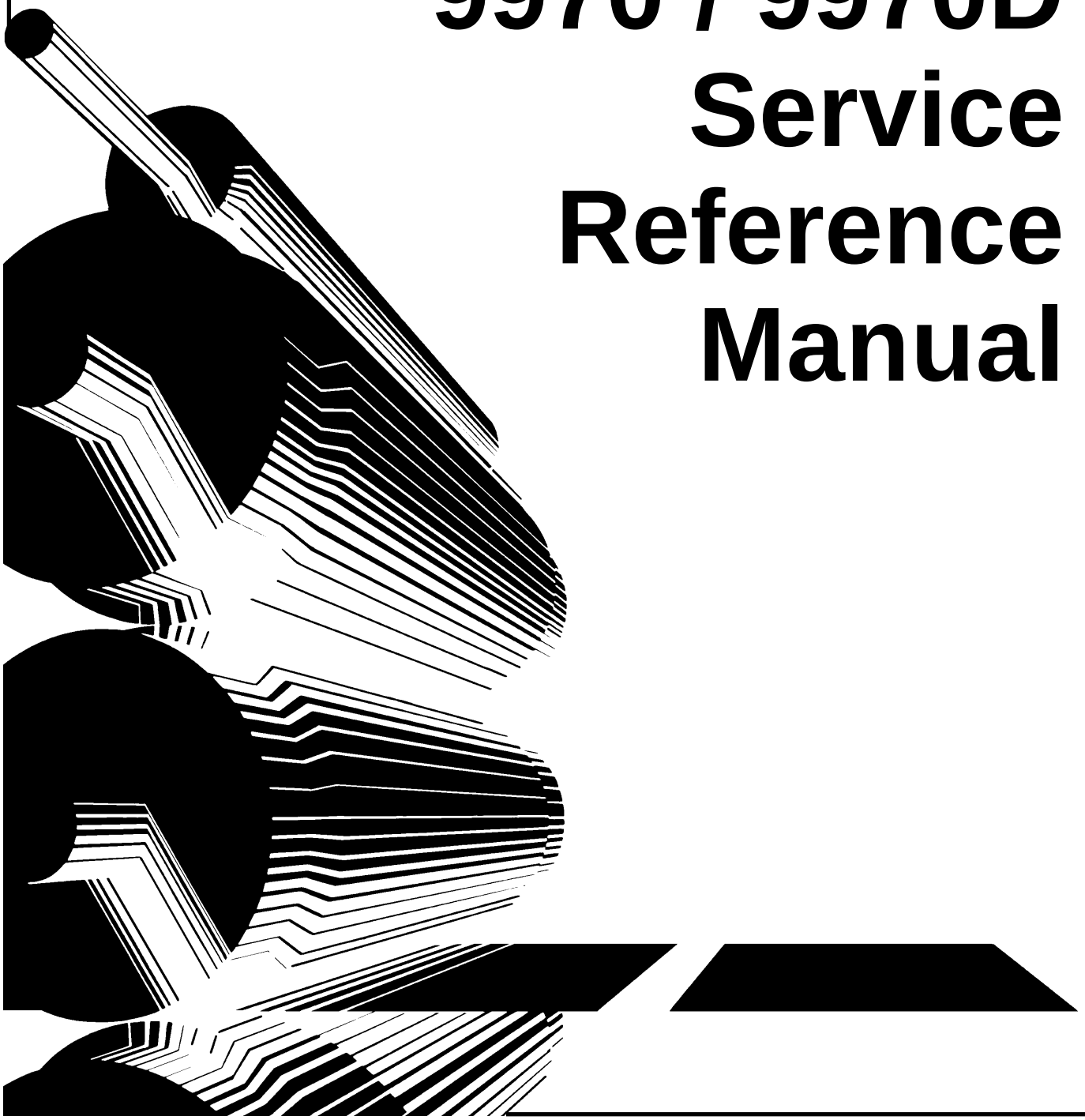
9970 / 9970D Service Reference Manual



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P/N 177210

Service Reference Manual

WARNING:

This equipment must be connected to a properly grounded three (3) wire outlet. Failure to do so creates a potential danger of electrical shock.

The circuit to which this equipment is connected must be current protected by a device with suitable current interruption capability as required by underwriters laboratories, Canadian standards association, N.E.M.A or local code (whichever is the most stringent).

When servicing this equipment with covers removed, exposed terminals are an electrical hazard. Caution must be exercised.

WARNING:

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment, This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

NOTE:

Users of this equipment service document are warned that A.B.Dick service documents are designed to be used in conjunction with an A.B.Dick service training class. An untrained person using this document, without the benefit of the accompanying training, could inadvertently cause damage to the equipment and/or cause injury to himself/herself or others. Users of this document are advised that A.B.Dick Company shall not be liable for any personal injury or property damage arising out of the use of this document by untrained persons.

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SECTION 1
INTRODUCTION

INTRODUCTION

This Service Reference Manual addresses the A.B.Dick Model 9970/9970D Offset Duplicators and contains the latest information available before "going to press". This manual is intended as a reference for service personnel familiar with the function, operation and adjustment of A.B.Dick Offset Equipment.

HOW TO USE THIS MANUAL

The manual is divided into sections. The sections are formally numbered (One, Two, Three, etc.), as indicated in the Table of Contents. The page numbers within each section are proceeded by the section number and a hyphen.

FOR EXAMPLE: Page 1 of Section One is designated Page 1-1.

Page 32 of Section Three is designated Page 3-32.

SAFETY PRECAUTIONS

This manual is intended for use by trained and qualified Technical Representatives. Persons not familiar with this equipment should not attempt any adjustments — bodily injury or equipment damage could result.

Always employ safe working practices when servicing this equipment:

* Don’t wear any jewelry.
* Don’t wear loose fitting clothes.
* Wear safety glasses.
* Follow all cautions and statements on the labels of the supplies you use.
* Pay special attention to all WARNINGS, CAUTIONS, and NOTES in this manual.

WARNINGS, CAUTIONS, and NOTES each have specific purposes. Disregarding a NOTE will cause you inconvenience, but not equipment damage or personal injury. Disregarding a CAUTION may cause equipment damage, but not personal injury. Disregarding a WARNING may cause personal injury.

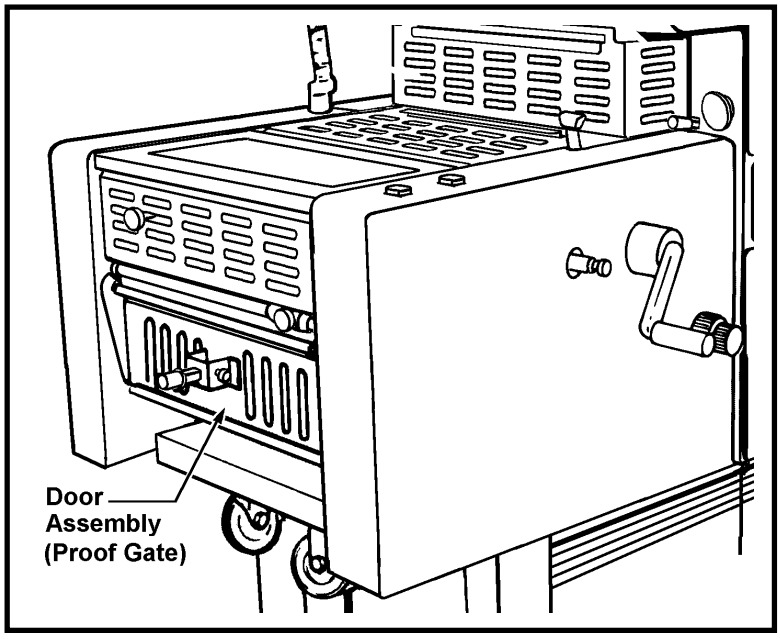
PROOF GATE

WARNING:

THERE ARE MOVING PARTS INSIDE THE PROOF GATE. SHUT DOWN THE MACHINE BEFORE INSERTING TOOLS OR HANDS. THIS IS NOT A SAFETY GUARD. THE MACHINE WILL CONTINUE TO RUN IF THE GATE IS OPENED.

NOTE:

The proof gate is designed only for access to pull one copy at a time for viewing during the run. It is not to be used as an access area to remove paper jams while the machine is running.



REQUIRED TOOLS

In addition to the basic hand tools the following gauges are required to calibrate the 9970:

QUANTITY	PART NUMBER	DESCRIPTION
1 each	191541	Suction Foot Adjusting Gauge
2 each	191544	.0615 Curved Feeler Gauge
1 each	191545	.0606 Flat Feeler Gauge
1 each	191546	Feeler Gauge Set
1 each	191548	Impression Cylinder Support Arm Gauge
1 each	191549	Master Cylinder Support Arm Gauge
1 each	191551	Cylinder Adjusting Tool
1 each	191552	1/4" x 11/32" Gripper Gauge
1 each	191555	Chain Gripper Bar Gauge (original)
1 each	191556	Impression Cylinder Gripper Gauge (Chain Delivery)
1 each	191737	Cylinder Adjusting Tool - Puller
1 each	191578	Leveling Bar (1/4" x 1" x 18")
1 each	--------	Paper Guide Adjusting Fixture
1 each	100614	Continuity Tester
1 each	--------	15/16" ± .005" Gauge
1 each	--------	Aligning Bar
1 each	196336	Cable Connector Tool
1 each	197058	.046 Right Angle Gauge
1 each	191678	Chain Gripper Bar Gauge (Pressed Anvils)

SPECIFICATIONS

1. PAPER SIZE
   3" x 5" to 13-1/2" x 17-3/4"
   (76 mm x 127 mm to 343 mm x 451 mm)
2. PAPER WEIGHT
   12 lb. (5.4 kg) Bond to 110 lb. (50 kg) Index
3. PRINTING AREA
   12-1/2" x 17-1/4" (318 mm x 438 mm)
4. PLATE SIZE
   Metal: 13" x 19-3/8" (330 mm x 492 mm)
   Paper: 12-3/4" x 18-1/8" (324mm x 460mm)
5. BLANKET SIZE
   12-5/8" x 19-3/16" (321 mm x 487 mm)
6. MASTER CYLINDER DIAMETER
   6.7560" ± .0007"
7. BLANKET CYLINDER DIAMETER
   6.6010"/6.5995"
8. IMPRESSION CYLINDER DIAMETER
   6.7587"/6.7573"
9. MACHINE FRAME SPACING
   17" (43.2 cm)
10. VERTICAL REGISTRATION
    ±.005" (± .127 mm)
11. LATERAL REGISTRATION
    ±.005" (± .127 mm)
12. PRINT ADJUSTMENT
    Raise: 5-1/2" (139 mm)
    Lower: 6-1/2" (165 mm)
13. BLANKET THICKNESS
    .068"/.066"
14. FEED TABLE CAPACITY
    20" or 5,000 sheets of 20 lb. paper
15. CHAIN DELIVERY PAPER CAPACITY
    20" or 5,000 sheets of 20 lb. paper
16. DUPLICATOR SPEED
    3,000 to 10,000 Copies Per Hour
17. GRIPPER MARGIN
    1/4" (6.35 mm)
18. POWER SOURCES
    200-240VAC 50/60 Hz/15 A
19. SOUND LEVEL (MAXIMUM)
    80 dB/A
20. POWER CONSUMPTION (MAXIMUM)
    200 VAC/50 Hz/10 A/1600 W
    200 VAC/60 Hz/10 A/1400 W
    220 VAC/50 Hz/10 A/1600 W
    230 VAC/60 Hz/10 A/1600 W
    240 VAC/50 Hz/10 A/2000 W
21. WEIGHT (APPROXIMATE)
    1000 lb. (450 kg.)
22. MESSAGE DISPLAY LANGUAGES AVAILABLE

Standard:	English
	Dutch
	German
	Japanese
Optional:	French
	Spanish

SECTION 2

FUNCTIONAL OPERATION

INTRODUCTION TO FUNCTIONAL OPERATION

The following discussion of the Model 9970 A.B.Dick Offset Duplicator explains the function of various parts of the machine. Each function will be discussed separately. The explanations are made with the assumption that all parts are in perfect condition and adjustment.

DIRECT DRIVE SPEED CONTROL

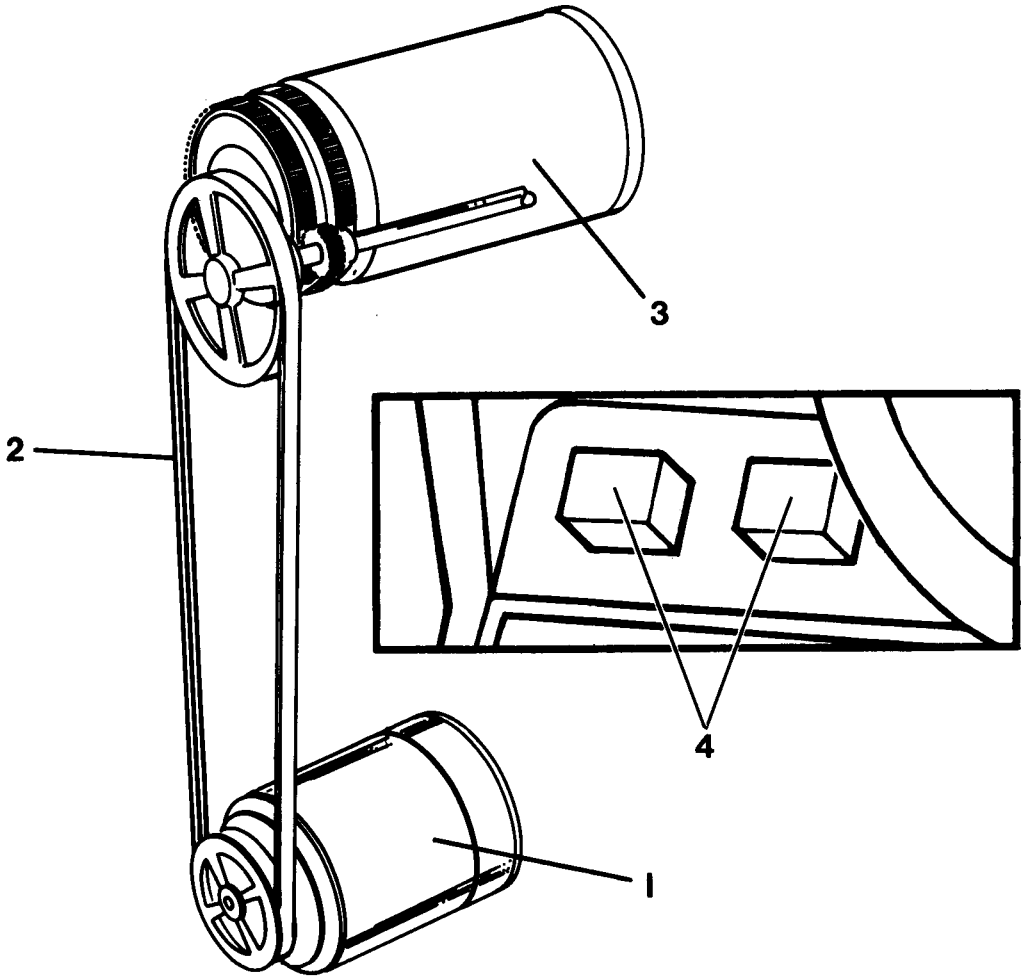
PURPOSE

Controls the drive and speed of the Drive Shaft and cylinders.

FUNCTION

The Drive Motor (1) turns the Drive Belt (2), turning the Blanket Cylinder (3). The Speed UP and Speed DOWN Switches (4) control a potentiometer which speeds up or slows down the Drive Motor. (Figure 2-1)

FIGURE 2-1



INK ROLLER AND RATCHETING SYSTEMS

Refer to Figure 2-2.

PURPOSE

Controls ink transfer from the Ink Fountain to the master or plate.

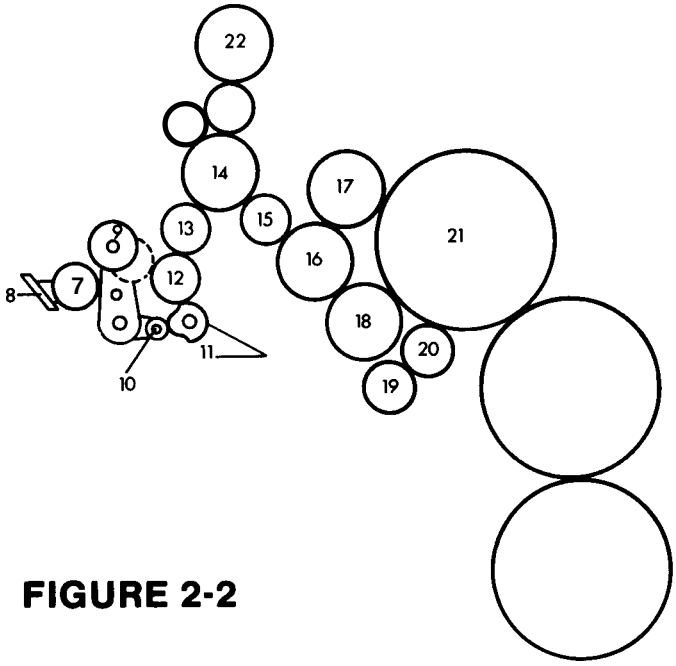
FUNCTION

Gear (1) rotates clockwise, moving link (2) and pivoting the Ratchet Lever (3) upward. With lever (4) lifted (on), lever (3) and pawl (5) advance the teeth of ratchet (6). Ratchet (6) turns the Ink Fountain Roller (7), transferring ink from the Ink Fountain (8) to the Ink Fountain Roller (7) and Ductor Roller (9).

When the truck (10) reaches the high of cam (11) (which is pinned to the gear (1) shaft), the Ink Ductor Roller (9) moves out of contact with the Ink Fountain Roller and pivots into contact with the Distributor Roller (12).

Ink is then transferred from the Distributor Roller (12) to the Rider Roller (13), the Upper Oscillator (14), the Rider Roller (15), the Main Ink Oscillator (16), the Upper Form Roller (17), the Lower Form Roller (18), the Auxiliary Form Roll Oscillator (19), and to the Auxiliary Form Roller (20). The three Form Rollers (17, 18, 20) transfer ink to the master or plate on the Master Cylinder (21).

The Ink Bridge Oscillator (22) provides additional ink milling.



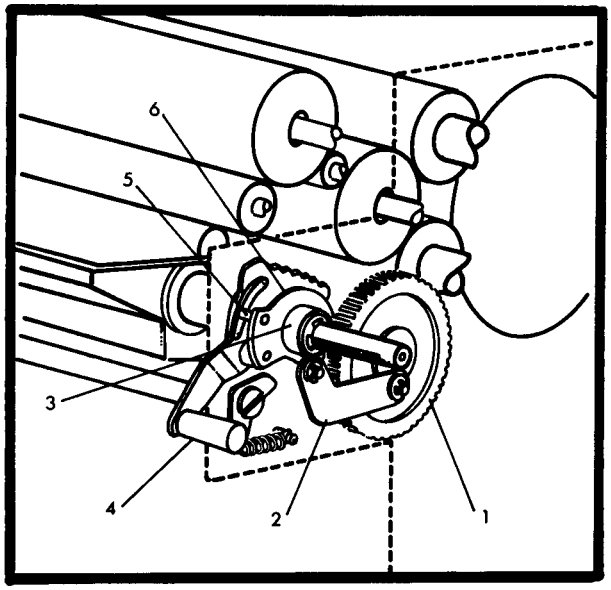


FIGURE 2-2

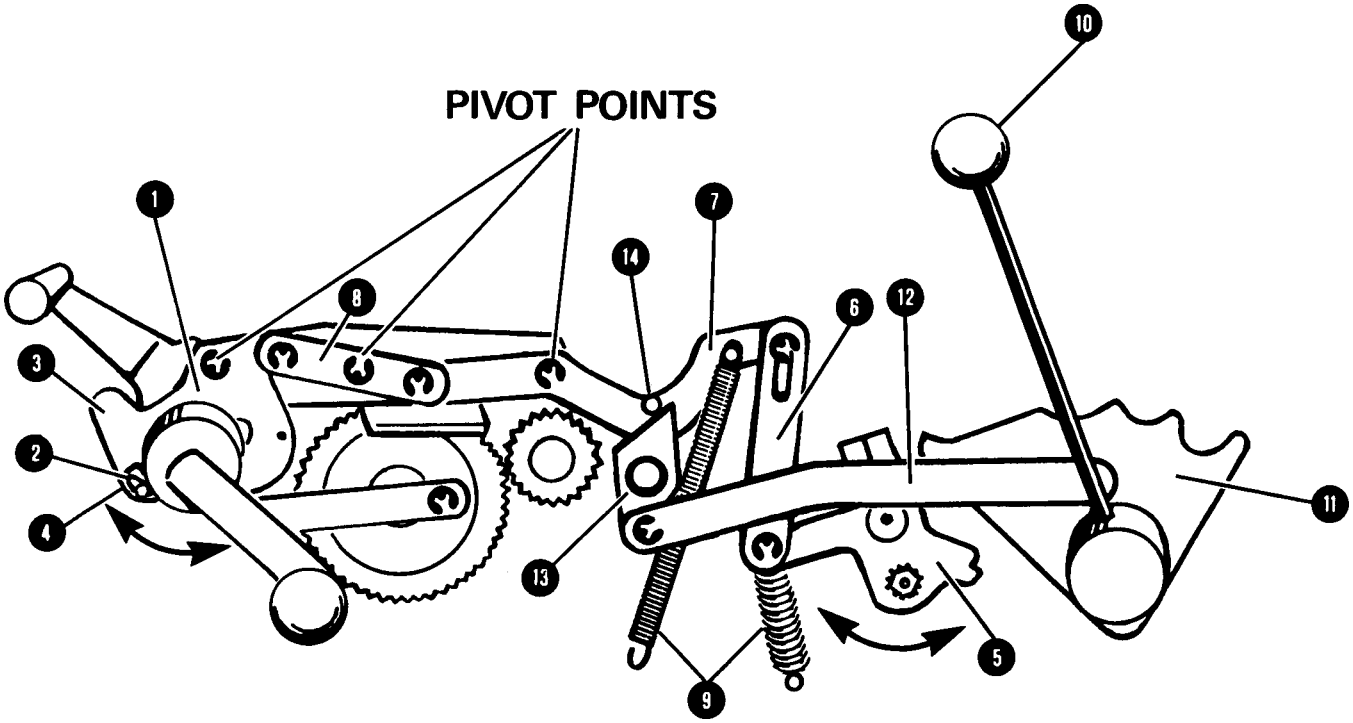


FIGURE 2-3

INK RATCHETING ON/OFF

Refer to Figure 2-3.

PURPOSE

A. Allows the Ink Fountain Roller to ratchet during duplication (while the Master Cylinder is latched).

B. Allows the Ink Fountain Roller to ratchet while the Single Lever Control is in the NEUTRAL position.

FUNCTION

Plate (1) is pivoted left only when the Master Cylinder is not latched and the Single Lever Control is not in the NEUTRAL position. Stud (2) is lifted when lever assembly (3) is turned clockwise, lifting pawl (4) to keep it from advancing the teeth of the ratchet. When plate (1) is positioned to the right, stud (2) is not lifted, allowing it to engage the teeth of the ratchet.

To allow ratcheting, plate (1) is prevented from pivoting left by one of the following means:

A

When the Master Cylinder is latched, the Master Cylinder Lever (5) stays in the clockwise position, holding up link (6), pivoting lever (7), and causing lever (8) to move plate (1) down to the right (clockwise). The plate (1) stays in that position until the Master Cylinder is unlatched.

When the Master Cylinder is not latched, the Master Cylinder Lever pivots back and forth. Link (6) moves upwards and springs (9) move link (6) and lever (7) back down, following the Master Cylinder Lever's pivoting action. The levers (7, 8) pivot plate (1) left and right. The plate (1) pivots to the left as stud (2) comes up, lifting it as described above.

B

When the Single Lever Control (10) is moved from NIGHT LATCH position to NEUTRAL position, the Sequence Control Cam (11) pulls Control Link (12) to the right, pivoting lever (13) to a vertical position to hold up the stud (14) on lever (7). Lever (7) pivots lever (8), pulling plate (1) to the right.

When the Single Lever Control is moved from NEUTRAL to INK, lever (13) is pivoted past the vertical position needed to hold up lever (7). The levers (7, 8) are once again allowed to move plate (1) left and right as the Master Cylinder Lever (5) moves back and forth. The plate (1) pivots to the left as stud (2) comes up, lifting it as described above.

SUPER AQUAMATIC SYSTEM

PURPOSE

Controls the transfer of fountain solution from the Aquamatic Fountain to the Master or Plate.

FUNCTION

The fountain solution flows from the Fountain Solution Bottle (1) into the Aquamatic Fountain (2). When the fluid reaches the bottle valve air cannot enter and vacuum prevents further flow of the solution. (Figure 2-4)

The Cams (3) turn and move Levers (4); the Levers (4) move the Aquamatic Ductor Roller (5). The Aquamatic Ductor Roller (5) is moved in and out of contact with the Aquamatic Oscillator Roller (6). This action transfers the fountain solution from the Aquamatic Fountain Roller (7) to the Oscillator (6).

A supply of fountain solution is then transferred to upper Form Roller (8), Form Roller Oscillator (9), lower Form Roller (10), and the Master or Plate on the Master Cylinder (11).

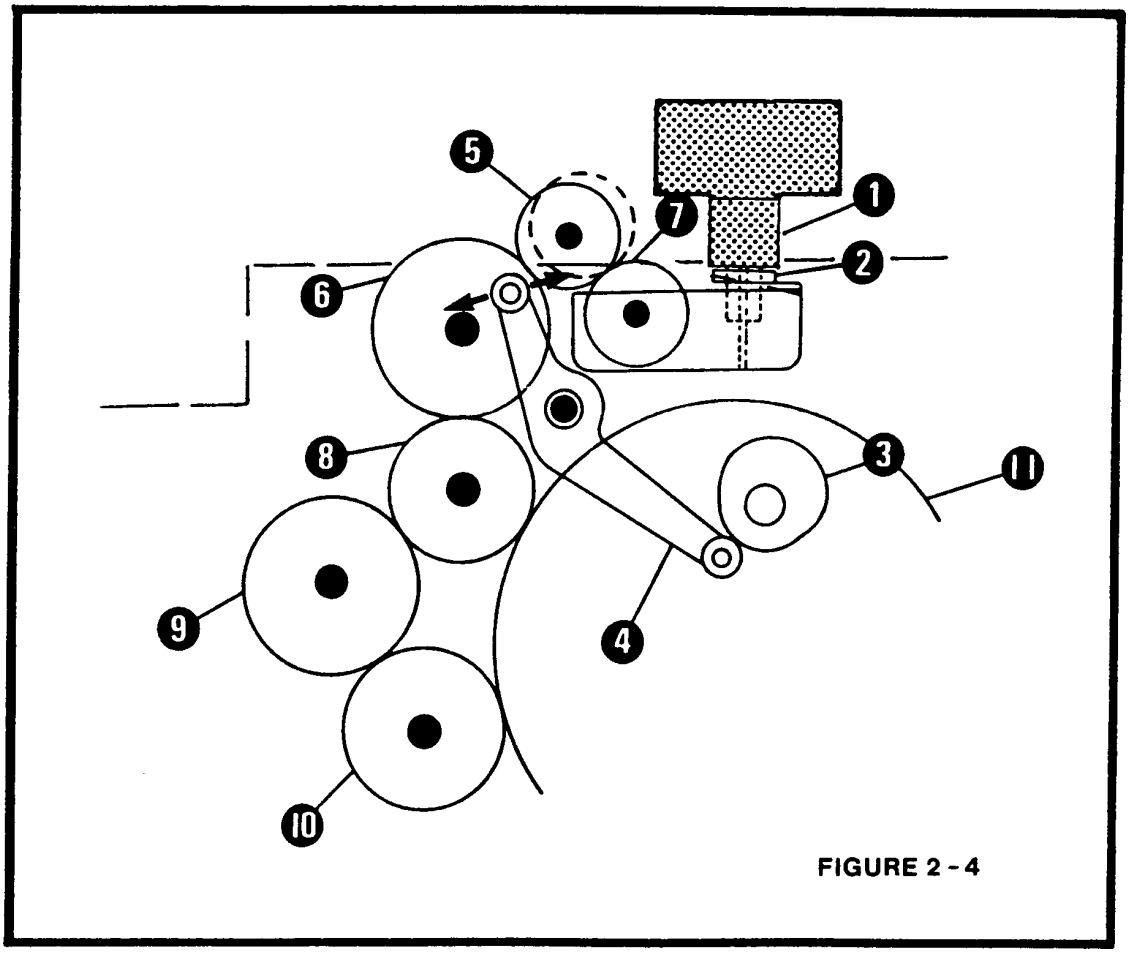


FIGURE 2 - 4

9970D NON-MOTORIZED CONTINUOUS DAMPENER

PURPOSE: Controls the transfer of fountain solution from the dampener to the master or plate.

FUNCTION:

1. Fountain solution flows from the bottle through the tubing to the filler valve assembly (1) (see Figure 2-5). The solution fills the nip between the plate form roller and the metering roller when the fluid level reaches the bottom of the filler valve (1). Air flow is shut off and the further flow of solution is prevented.
2. The dampener is controlled through the operator control lever. Movement of the lever in a clockwise direction rotates the eccentric dampener shaft (2), lowering the assembly into contact with the plate. Water control is automatically increased with the speed of the press, since the dampener is driven by the master cylinder.

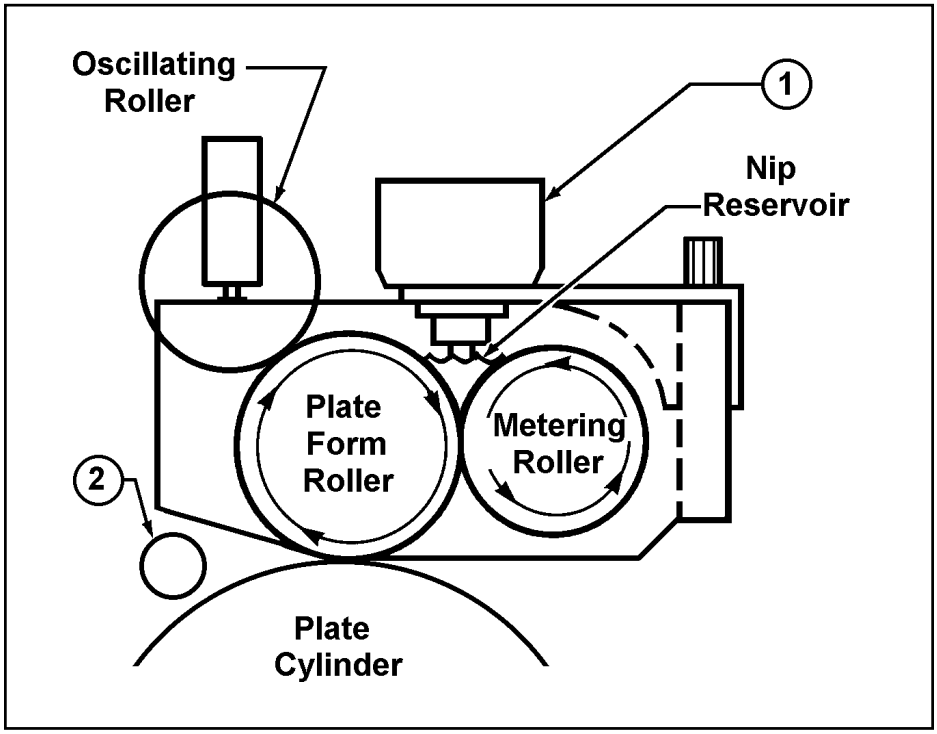


FIGURE 2-5

OPERATION CONTROL HANDLE

Once the duplicator has been set up to run, the Operation Control Handle is used to perform the duplicating process. It has five settings: Night Latch, Neutral, Ink, Image, and Feed.

OPERATION CONTROL HANDLE IN NIGHT LATCH

PURPOSE

Separates the Upper and Lower Form Rollers from the Main Ink Oscillator so the Form Rollers do not develop flat spots during idle periods.

FUNCTION

With the Operation Control Handle (1) in NIGHT LATCH, the cams (2) (on both the operator and non-operator sides) spread the levers (3) apart. The levers (3) prevent the Upper (4) and Lower (5) Form Rollers from contacting the Main Ink Oscillator (6). (Figure 2-6)

NOTE:

To separate the Auxiliary Form Roll Oscillator (7) from the Lower Form Roller (5), the two Screws (8) are loosened.

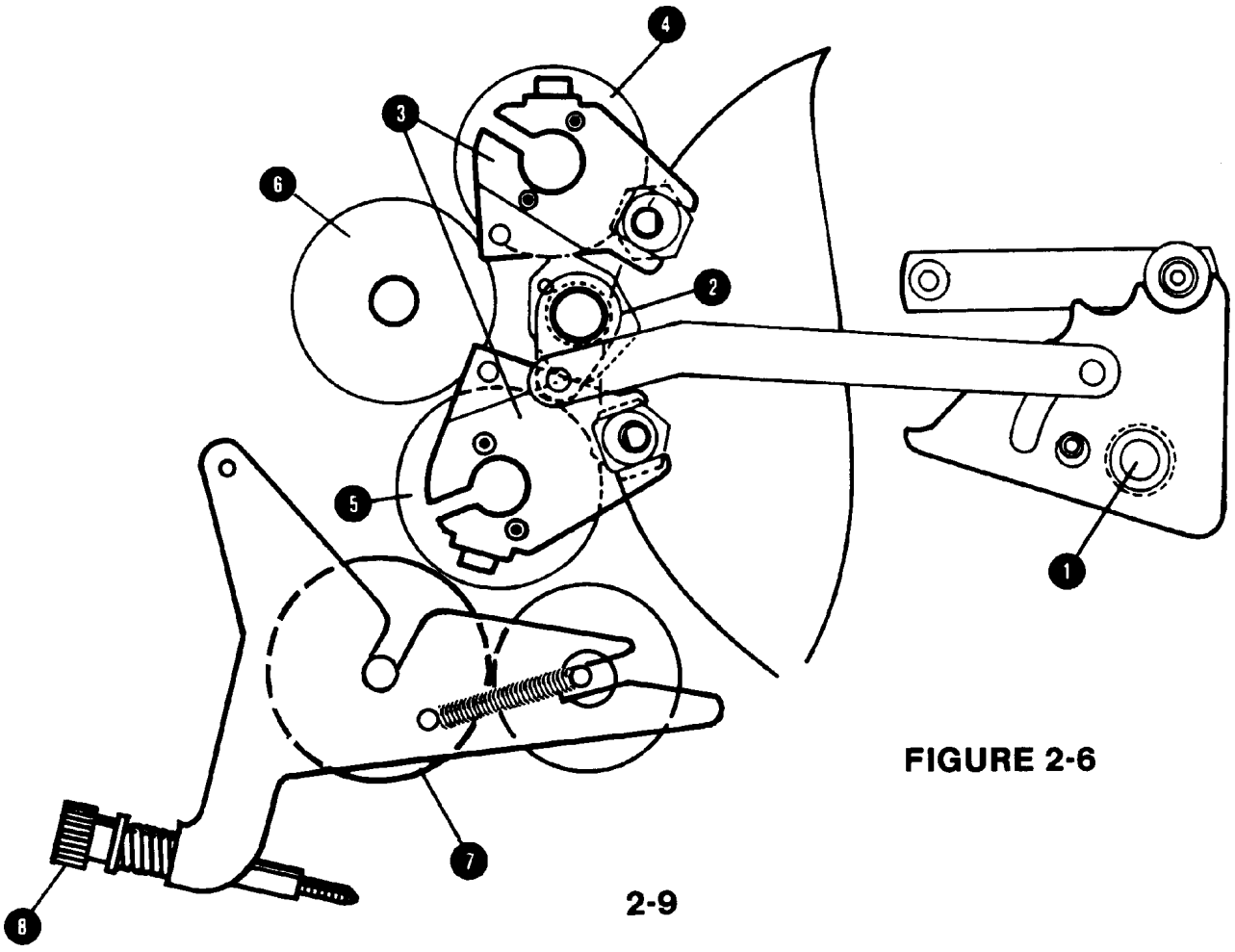


FIGURE 2-6

2-9

OPERATION CONTROL HANDLE - NIGHT LATCH TO NEUTRAL

PURPOSE

Places the Form Rollers in contact with the Main Ink Oscillator.

NOTE:

Placing the Operation Control Handle into Neutral position also activates Ink Fountain Roller Ratcheting as described in previous section: "Ink Ratcheting On/Off".

FUNCTION

When the Operation Control Handle (1) is moved from NIGHT LATCH to NEUTRAL, link (2) pivots lever (3) and the Night Latch Shaft (4) counterclockwise. Shaft (4) turns cams (5). Cams (5) permit the Form Roller Levers (6) to move the Upper (7) and Lower (8) Form Rollers into contact with the Main Ink Oscillator (9). (Figure 2-7)

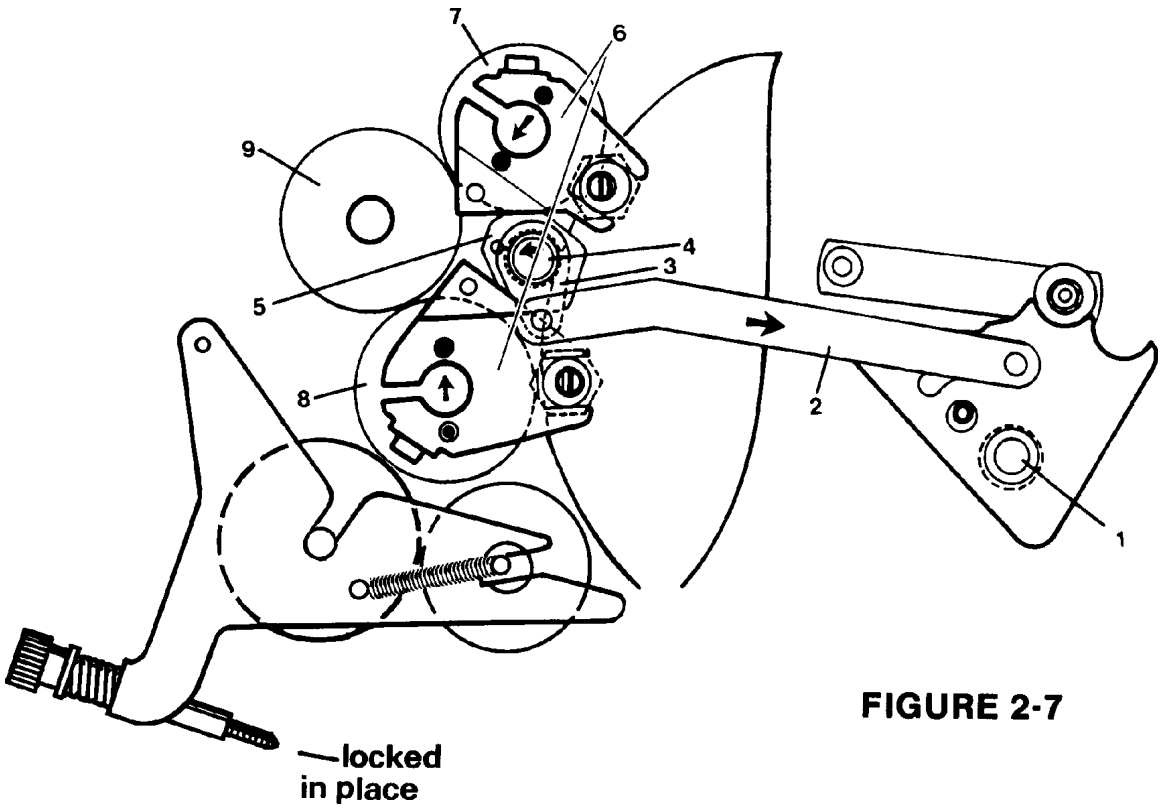


FIGURE 2-7

OPERATION CONTROL HANDLE - NEUTRAL TO INK POSITION

PURPOSE

Places the Form Rollers in contact with the Master or Plate.

NOTE:

Moving the Operation Control Handle from NEUTRAL to INK position also deactivates Ink Fountain Roller Ratcheting as described in previous section: "Ink Ratcheting On/Off".

FUNCTION

When the Operation Control Handle (1) is moved to INK, link (2) pivots lever (3) and shaft (4) counterclockwise. Shaft (4) turns cams (5). Cams (5) and studs (6) permit the slides (7) to move toward the Master Cylinder. (Figure 2-8)

Springs (8) seat the pins (9) of the Form Roller Levers (10) against the slides (7). The slides (7) and Form Roller Levers (10) move toward the Master Cylinder and position the Upper (11) and Lower (12) Form Rollers into contact with the Master Cylinder.

As the Lower Form Roller (12) moves towards the Master Cylinder, the Auxiliary Form Roll Oscillator (13) moves upward, staying in contact with the Lower Form Roller (12). Oscillator (13) moves upward because springs (14) push the entire Auxiliary Form Roller Assembly upward, pivoting on shafts (15). As the assembly moves upward, the Auxiliary Form Roller (16) comes into contact with the Master Cylinder.

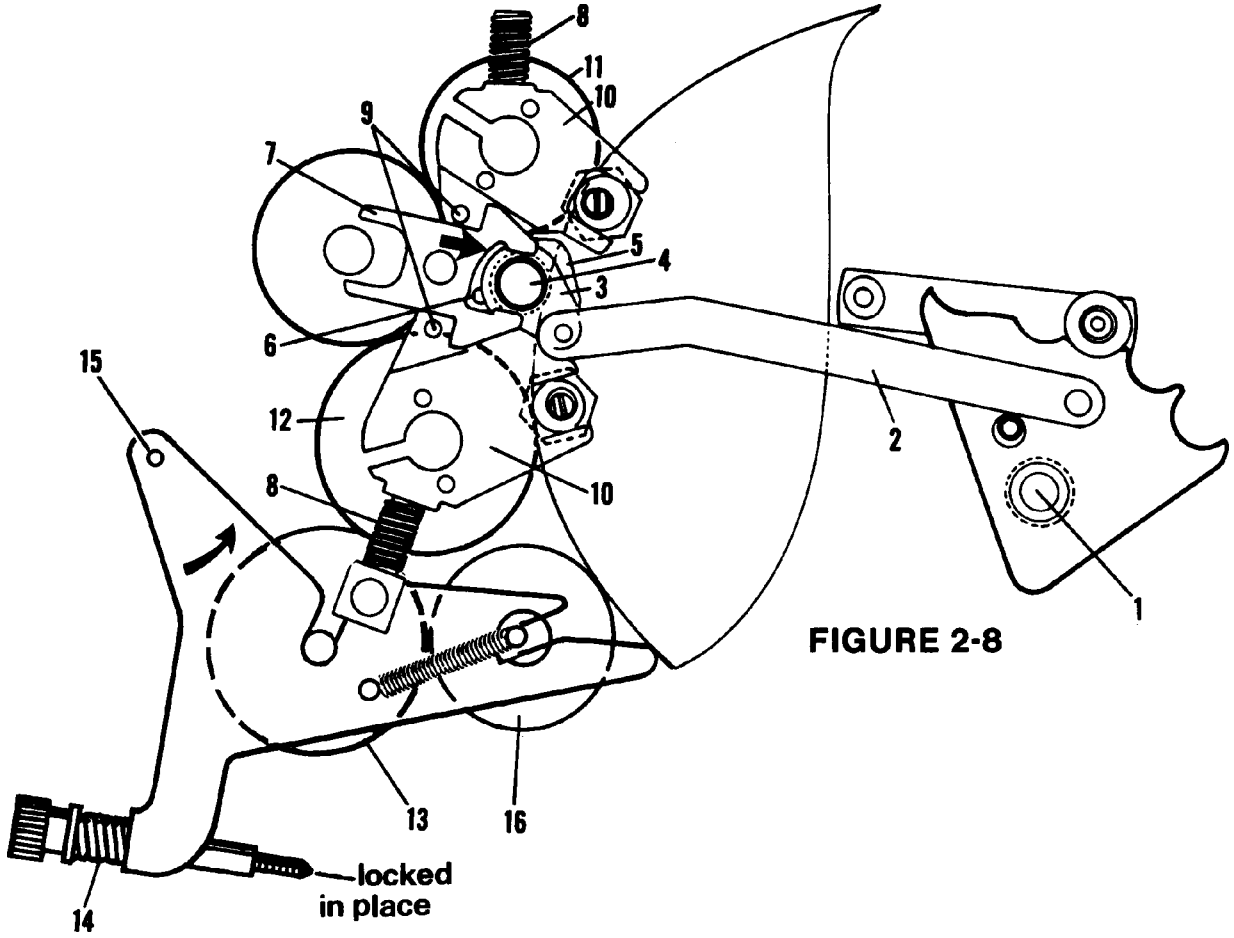


FIGURE 2-8

OPERATION CONTROL HANDLE - INK TO IMAGE

PURPOSE

Allows the Master Cylinder to contact the Blanket Cylinder.

FUNCTION

When the Operation Control Handle (1) is moved to IMAGE, stud (2) lifts the Arm Assembly (3), lifting the Master Cylinder Latch (4). As the cylinders turn, the Master Cylinder Lever (5) is engaged by latch (4). (Figure 2-9)

Lever (5) (on the Master Cylinder Eccentric Shaft), lowers the Master Cylinder (6) into contact with the Blanket Cylinder (7).

When the Detent Cam (8) was moved to IMAGE, the link (9) was moved up by the screw and disc (10); stud (11) was moved out of its notch permitting cam (8) to move to IMAGE. (Figure 2-10)

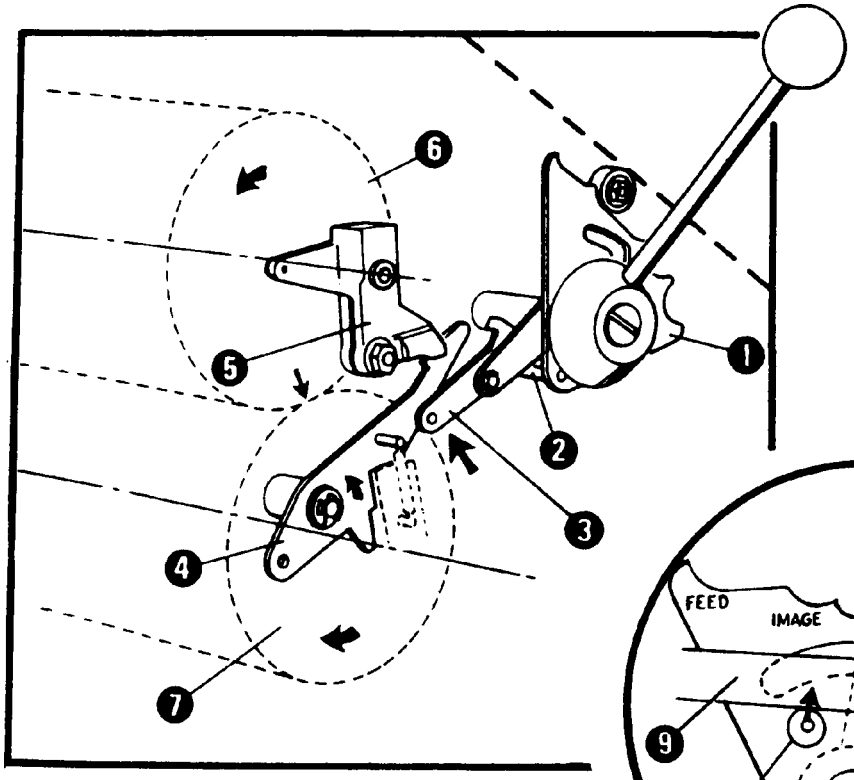


FIGURE 2-9

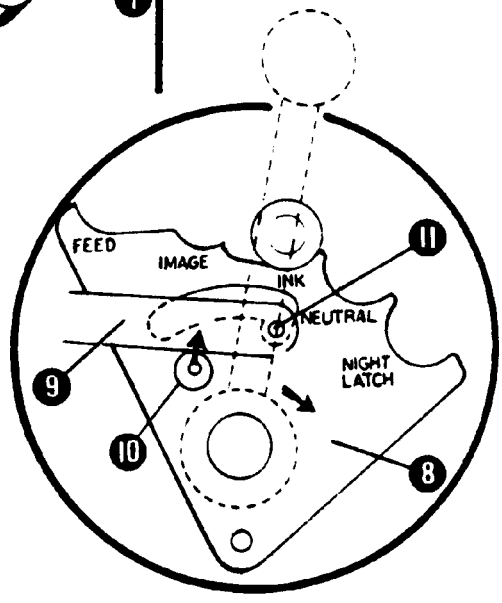


FIGURE 2-10

NOTES

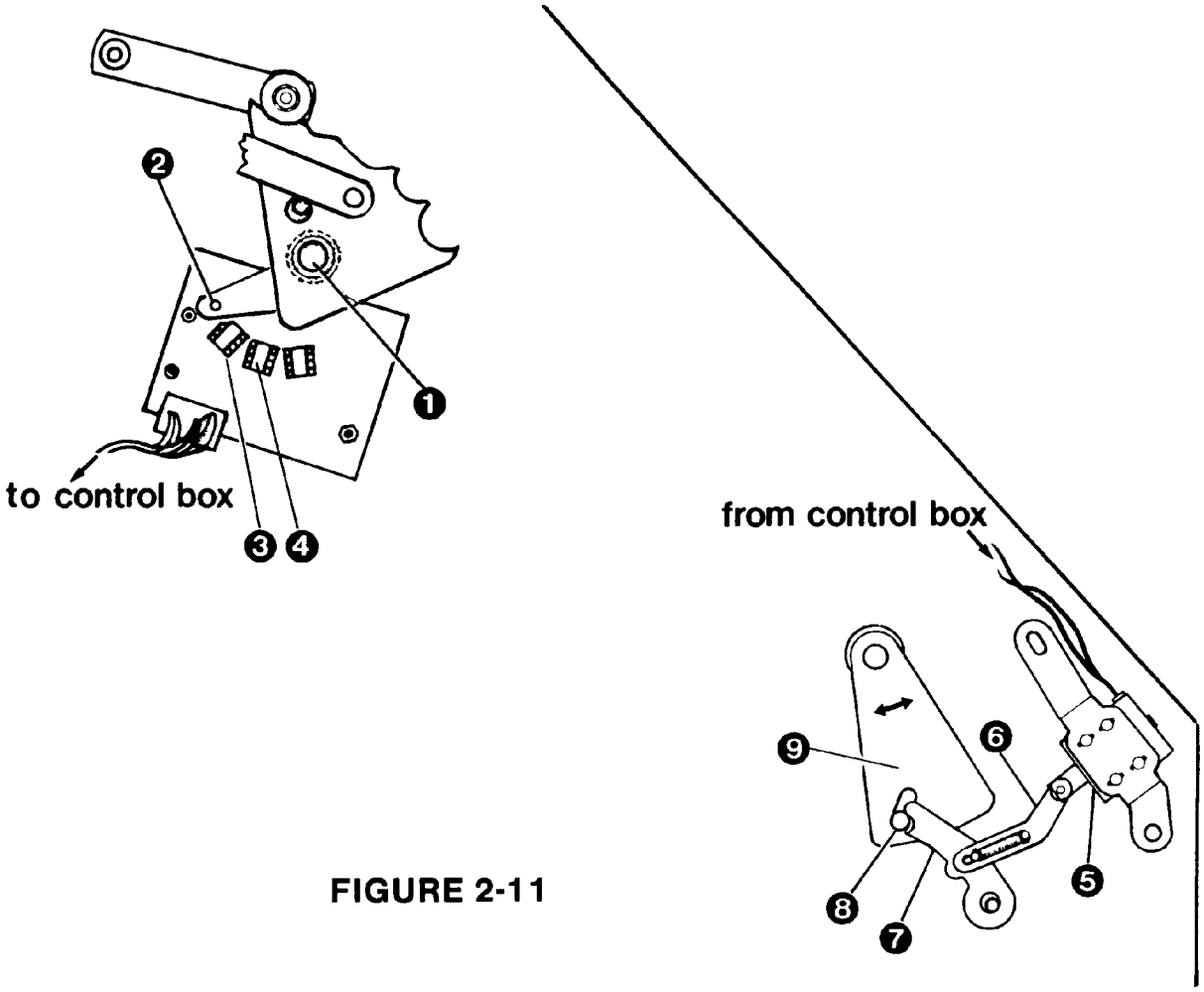


FIGURE 2-11

OPERATION CONTROL HANDLE - FEED

PURPOSE

A. Permits full movement of the Header Tube Assembly with each revolution of the cylinders during normal sheet feed.

B. Permits full movement of the Header Tube Assembly with every other revolution of the cylinders during alternate sheet feed.

FUNCTION

When the Operation Control Handle (1) is moved to the FEED position and then released, it will return to either IMAGE or INK. (Figure 2-11)

A

With the Operation Control Handle (1) in the IMAGE position, the magnet on arm (2) activates Hall Effect Sensor (3). When the handle is moved to the FEED position, no sensors are activated. As the handle passes the IMAGE position and rests in the INK position, Sensors (3) and (4) are activated.

The microprocessor interprets two signals from Sensor (3) followed by a signal from Sensor (4) as a command to activate the Feed Control Solenoid (5).

The solenoid (5) pulls link (6) and Latch Lever (7). Lever (7) releases the Feed Latch (8), allowing the Header Tube Assembly (9) to move freely. The Header Tube Assembly (9) rocks back and forth once with each revolution of the cylinders.

NOTE:

The Feed Control Solenoid may also be activated by depressing the Feed Key on the Keyboard, or the Feed Button on the Chain Delivery.

B

For Alternate Sheet Feed the Operation Control Handle is moved from IMAGE to FEED, and is returned back to the IMAGE position. A signal from Sensor 3 is followed by another signal from Sensor 3.

The microprocessor interprets two signals in a row from Sensor 3 as a command to commence Alternate Sheet Feed. The Feed Control Solenoid (5) is activated and deactivated to allow the Header Tube Assembly (9) free movement only during every other cylinder revolution.

The Operation Control Handle is moved from IMAGE to INK to return to normal feed, and the microprocessor interprets the signal from Sensor (4) as a command to begin normal sheet feed. If the handle is moved back to IMAGE the signal from Sensor 3 will once again commence Alternate Sheet Feed.

PAPER FEED

PURPOSE

Moves the Suction Feet vertically and horizontally.

FUNCTION

Horizontal Movement

Whenever the machine is running, the Suction Feet will move horizontally; the truck and lever (1) follow the high of cam (2). The link (3) moves lever (4) and lever (4) moves truck (5) which pivots lever (6) and the Suction Feet Assembly (7). The Suction Feet (8) then move forward. (Figure 2-12)

Vertical Movement

When the Feed Control Solenoid is "ON," the truck and lever (9) are permitted to follow cam (10). The truck and lever (9) move link (11) which pivots lever (12). Shaft (13) is turned by lever (12). Shaft (13) will pivot links (14) which move the Suction Feet Assembly (7) down. The Suction Feet (8) will then lift up a sheet of paper and the horizontal movement will forward it to the crotch of the Forwarding Rollers.

The correct timing of the vertical and horizontal movement is controlled by the positions of cams (2) and (10).

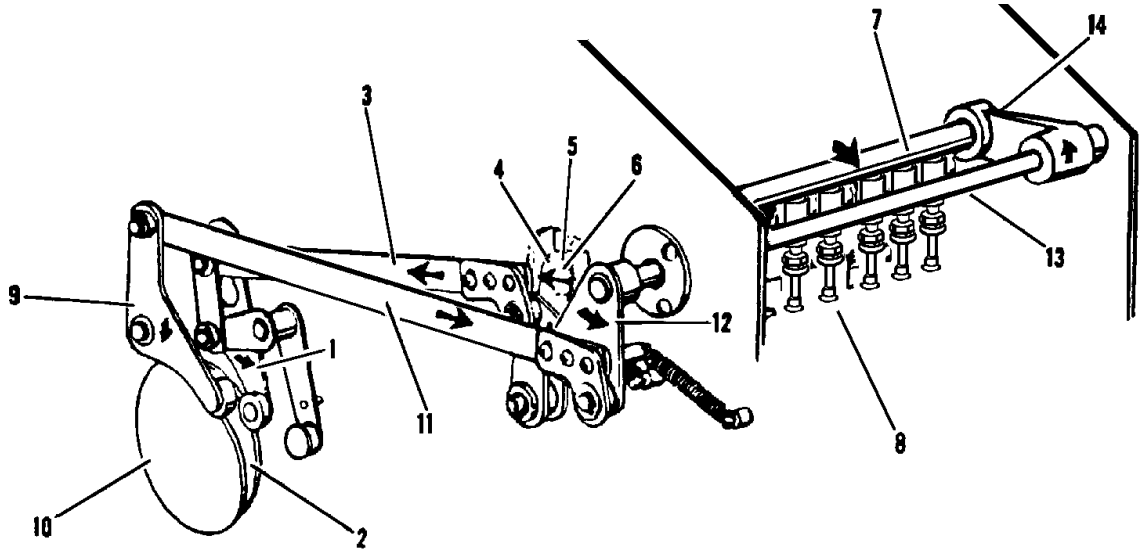


FIGURE 2-12

PAPER FORWARDING

PURPOSE

Forwards paper to the grippers.

FUNCTION

The Suction Feet (1) deliver a sheet of paper to the crotch of the Forwarding Rollers (2, 3). Spring tension holds the Forwarding Rollers together when lever (4) follows the low of cam (5). The Forwarding Rollers (2, 3) deliver paper to the grippers. The rollers are held together and the forwarding action continues until after the grippers are closed. (Figure 2-13)

The Upper Forwarding Rollers (2) are lifted out of contact with the Lower Forwarding Rollers (3), when truck and lever (4) are on the high of the cam (5).

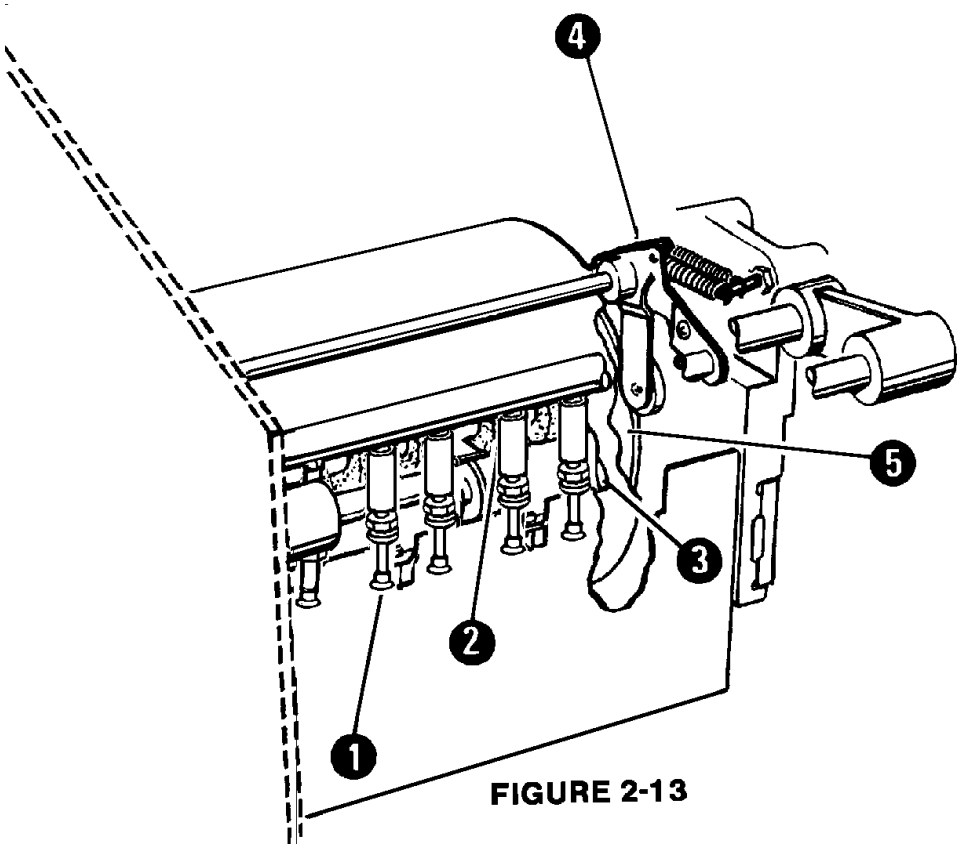


FIGURE 2-13

PAPER BUCKLE CONTROL

PURPOSE

Ensures paper will be fed completely into the Impression Cylinder Grippers.

FUNCTION

The Buckle Control (1) is turned, causing lever (2) to pivot, lifting links (3 and 4). When link (4) is moved up in the slot of lever (5) its stroke is increased. Link (4) will increase the forward movement of levers (6). The Suction Feet (7) will then deliver the paper sooner to the Forwarding Rollers (8). (Figure 2-14)

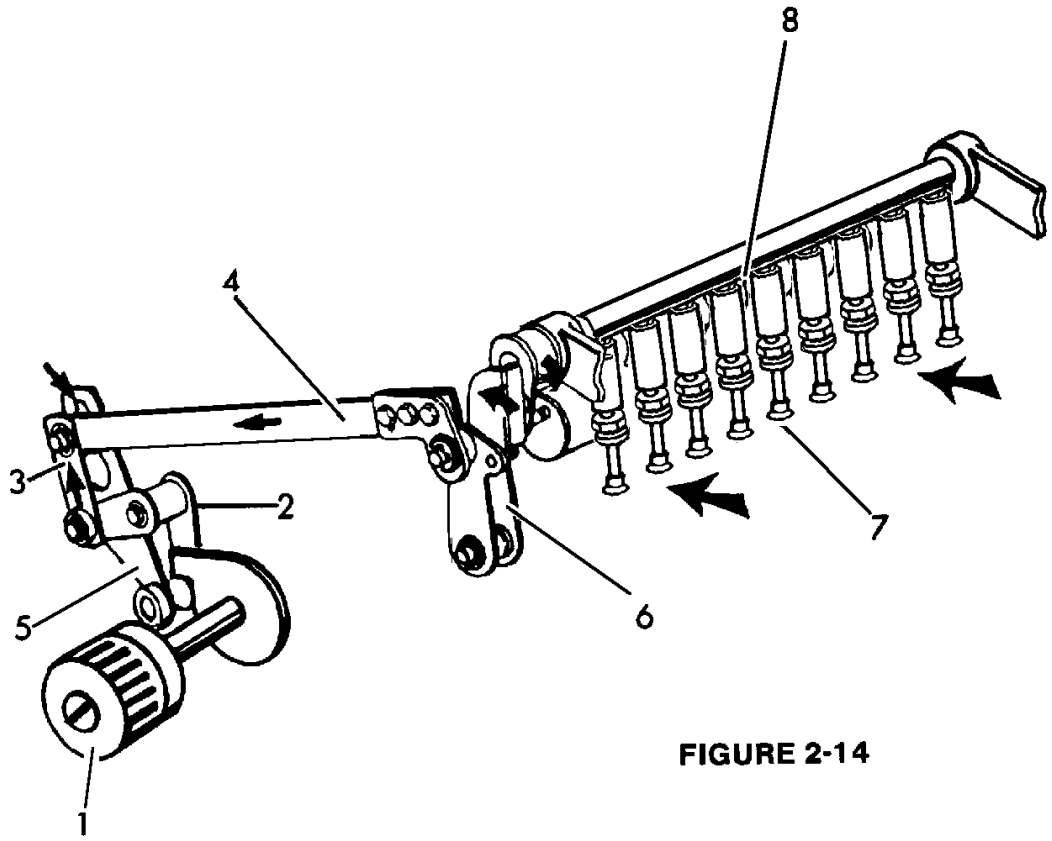


FIGURE 2-14

VACUUM MAKE AND BREAK VALVE

PURPOSE

To pick up and release the paper.

FUNCTION

As the Suction Feet are lowered, the truck and lever (1) move to the low of cam (2). Link (3) causes lever (4) to close the valve (5) opening. Suction is caused when valve (5) is closed, causing the top sheet of the paper to be lifted. When the sheet of paper has been forwarded to the Forwarding Rollers, valve (5) is opened. The opening of valve (5) breaks the vacuum which causes the Suction Feet to release the sheet. (Figure 2-15)

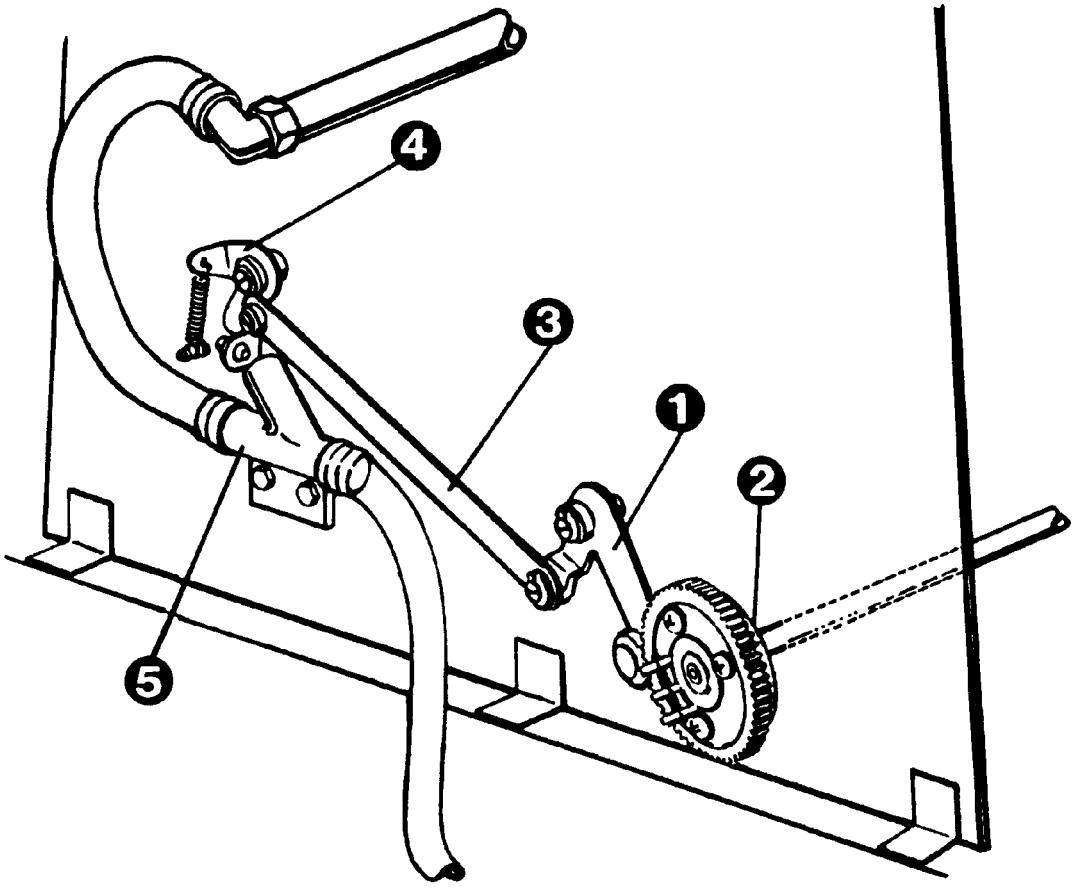


FIGURE 2-15

IMPRESSION CYLINDER PAPER GRIPPERS

PURPOSE

To grip paper and feed it to the Chain Delivery Grippers.

FUNCTION

The paper is fed by the Forwarding Rollers into the grippers (1) and against the Paper Stops (2). (Figure 2-16)

As the Impression Cylinder turns, truck (3) moves to the high of the Gripper Cam (4). Truck (3) pivots the lever (5), pivoting the Lever Assembly (6), closing the grippers (1) on the lead edge of the paper.

As the Impression Cylinder keeps turning, the truck (3) moves to the low of the cam (4). Springs pivot the lever (5) and Lever Assembly (6) in the opposite direction, opening the grippers (1) and releasing the lead edge of the paper.

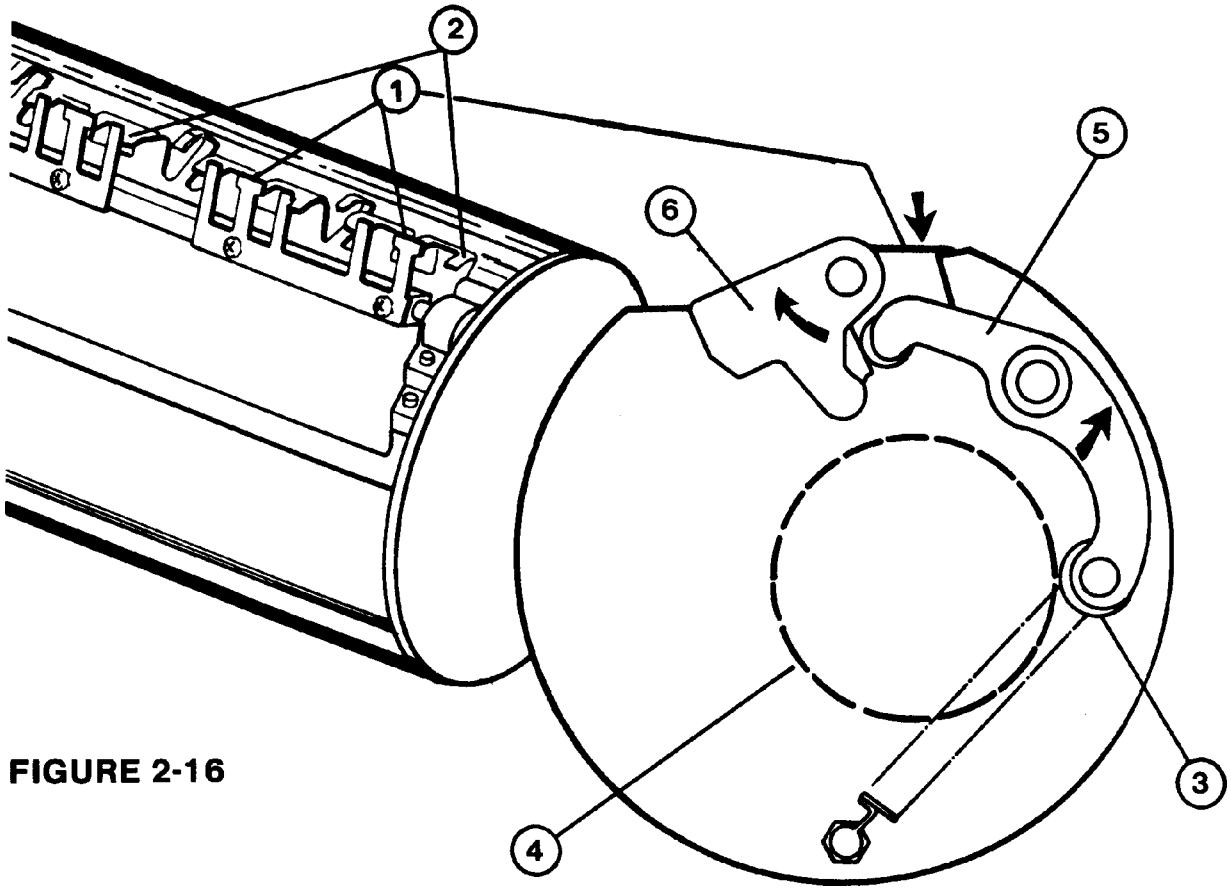


FIGURE 2-16

IMPRESSION CYLINDER LATCHING

PURPOSE

Lifts and holds the Impression Cylinder against the Blanket Cylinder.

FUNCTION

Operation of the Unlatched Impression Cylinder

As cam (1) rotates, it moves the Power Lever (2) , which pivots at point (3). The power lever pushes truck (4) on the Impression Cylinder Lever (5), which moves back and forth (when not latched). The Impression Cylinder Shaft (6) is eccentric. As lever (5) moves back and forth, the Impression Cylinder raises and lowers. The machine is timed so the Impression Cylinder is raised against the Blanket Cylinder only when the cylinder openings face each other. (Figure 2-17)

Impression Cylinder Latching

When paper is fed, the Impression Cylinder Latch Solenoid (7) lifts lever (8), which in turn lowers the Latch Lever (9). The Latch Lever (9) engages the Impression Cylinder Lever (5) as it moves to the left, preventing it from moving back towards the right. The eccentric Impression Cylinder Shaft (6) is kept in the position which holds the Impression Cylinder against the Blanket Cylinder, where it will stay as long as the solenoid (7) is kept activated.

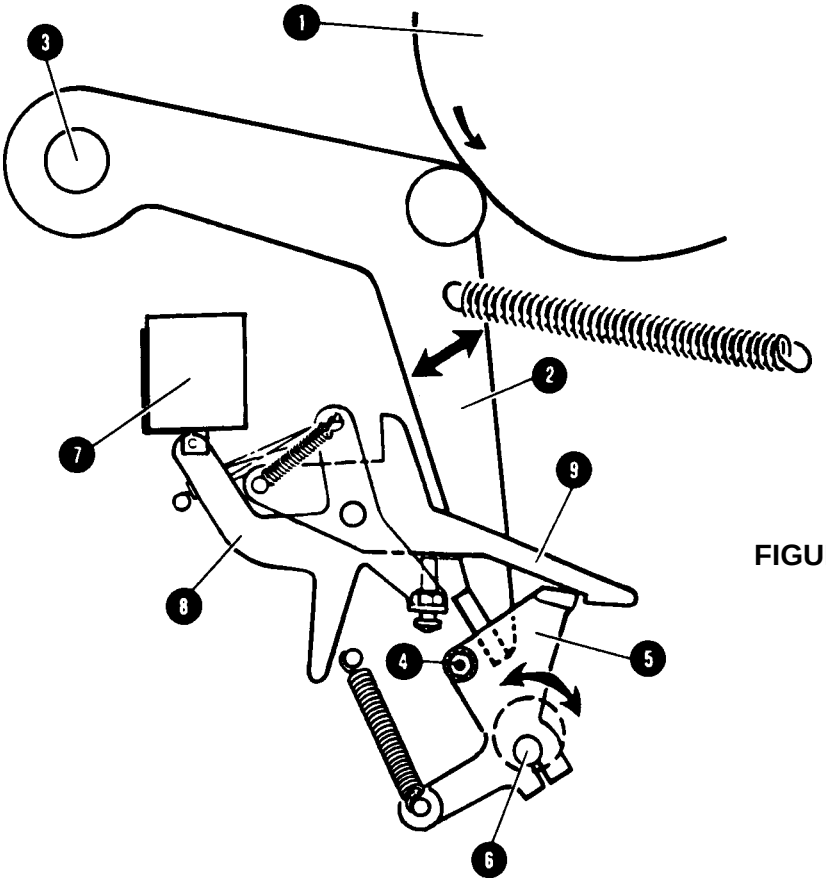


FIGURE 2-17

MASTER CYLINDER LATCHING

PURPOSE

When the Operation Control Handle is moved from INK directly to FEED, the Master Cylinder automatically latches (is held against the Blanket Cylinder) one revolution after the Impression Cylinder latches.

FUNCTION

When the Impression Cylinder latches, the Counter Operating Lever (1) (on the operator side of the Impression Cylinder Shaft) turns. Lever (1) with spring (10) attached lifts the Master Cylinder Link (2) up. The Master Cylinder Latch (3) is pushed up to engage the Master Cylinder Lever (4). (Figure 2-18)

Lever (4) is engaged when the Master Cylinder Power Lever (5) moves to the high of cam (6), turning lever (4). Lever (4), on the eccentric Master Cylinder Shaft (7), lowers the Master Cylinder (8) into contact with the Blanket Cylinder (9). The Master Cylinder (8) will be kept lowered as long as the Impression Cylinder is latched, since lever (4) stays engaged by latch (3).

NOTE:
The Master Cylinder may also be latched for imaging and running down the blanket as described in previous section: "Operation Control Handle - Ink to Image."

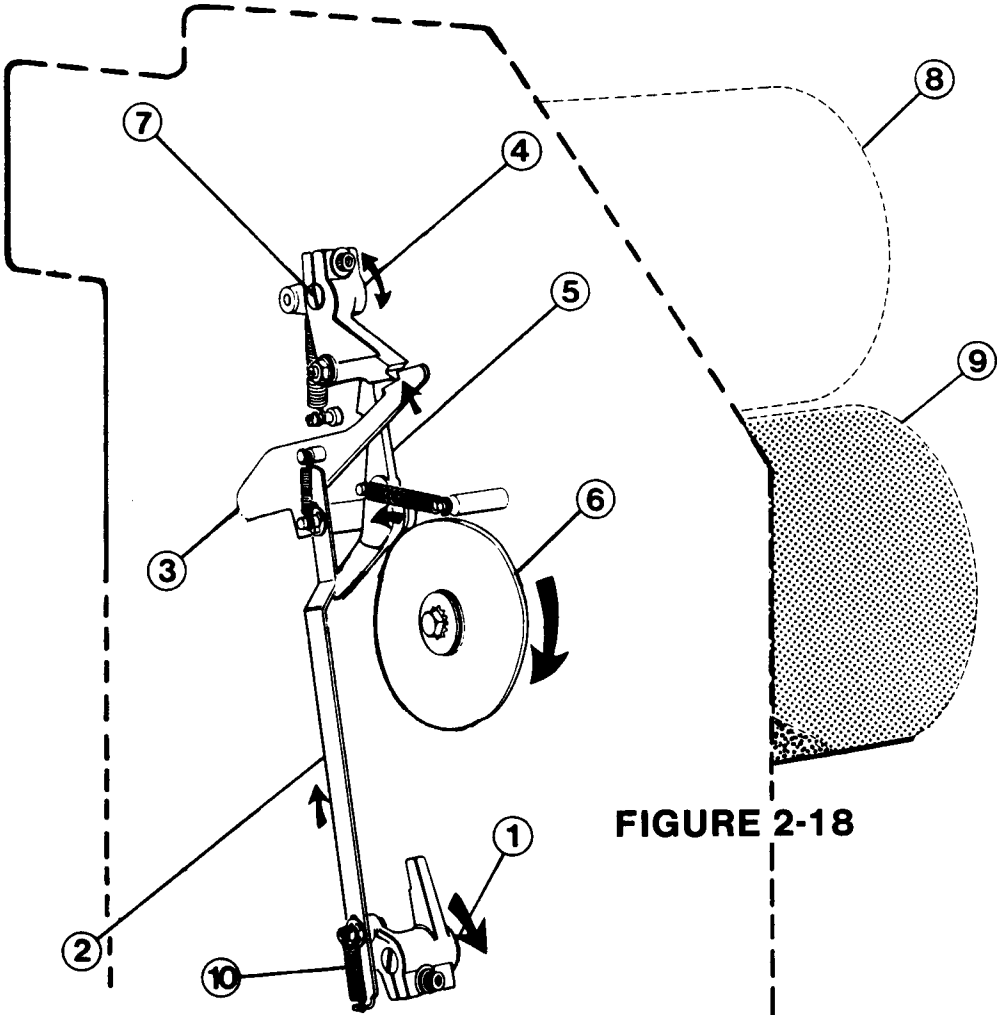


FIGURE 2-18

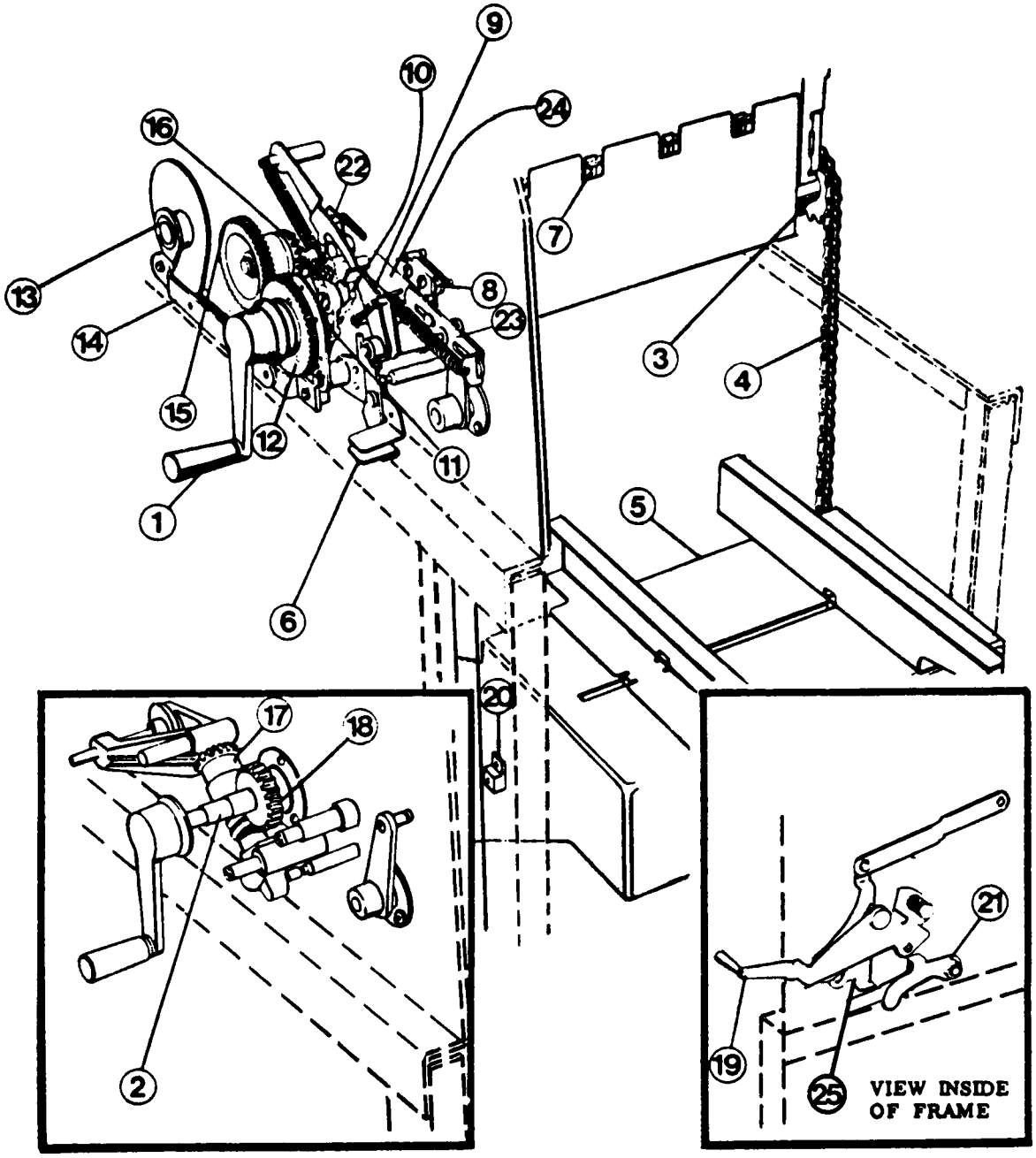


FIGURE 2-19

TABLE RAISE

PURPOSE

Raises the Feed Table to the proper feeding level.

FUNCTION

Manual

The Paper Crank (1) is turned clockwise, turning gear (12). Gear (12) turns gear (15), Bevel Gear (16), Worm Gear (17), gear (18), and shaft (2).

Shaft (2) turns sprockets (3) and chains (4) (operator and non-operator sides). The chains (4) lift the Feed Table (5). (Figure 2-19)

Automatic (Table Release Lever [6] is up)

The Paper Height Regulators (7) move up and down, sensing for paper. When the feeding level of the paper stack is lowered, the Paper Height Regulators (7) move down. When the Paper Height Regulators (7) move down, the sliding link (23) moves to the right. Pin (24), attached to the backside of link (23), contacts the Linkage Plate (8), causing latch (9) to release lever (10). Pawl (11), connected to lever (10), turns gear (12) by means of a ratchet located behind gear (12). The Power Lever (22) moves lever (10). The Power Lever (22) is driven by the Crank Arm (13) and link (14).

The ratcheting of gear (12) turns gear (15), Bevel Gear (16), Worm Gear (17), gear (18), and shaft (2). Shaft (2) turns sprockets (3) and chains (4) (operator and non-operator sides). Chains (4), lift the Feed Table (5). The table (5) is lifted until the downward action of the Paper Height

Regulators (7) is restricted. When the regulators (7) are restricted, link (23) is not allowed to travel fully to the right. Pin (24), attached to link (23), does not contact the Linkage Plate (8). The Linkage Plate (8) allows latch (9) to hold lever (10), stopping the ratcheting of gear (12).

The feed level of the table (5) may be changed by moving the Table Raise

Lever (19). Lever (19) changes the stroke of the Paper Height Regulators (7). This controls when lever (10) is permitted to turn gear (12).

The Trip Bracket (20) restricts the table (5) from raising too high and damaging the machine. The Trip Bracket (20) raises lever (21) to prevent lever (25) from rotating, preventing the Paper Height Regulators' (7) downward movement. This action does not allow lever (10) to turn gear (12).

NOTE:

When Lever Stop (22) is raised by the Table Raise Acceleration Knob on the inside of the operator side frame, Pawl (11) turns Gear (12) four teeth per revolution versus one tooth per revolution in normal mode.

AIR AND VACUUM SYSTEM

PURPOSE

Controls the air and vacuum for use in paper feed.

FUNCTION

Air is drawn into the system through the Suction Feet, the Vacuum Make and Break Valve and the Vacuum Adjustment Valve. (Figure 2-20)

The compressor pumps air through the Blower Tubes and out the holes in the Paper Height Regulators, and out through the Air Adjustment Valve.

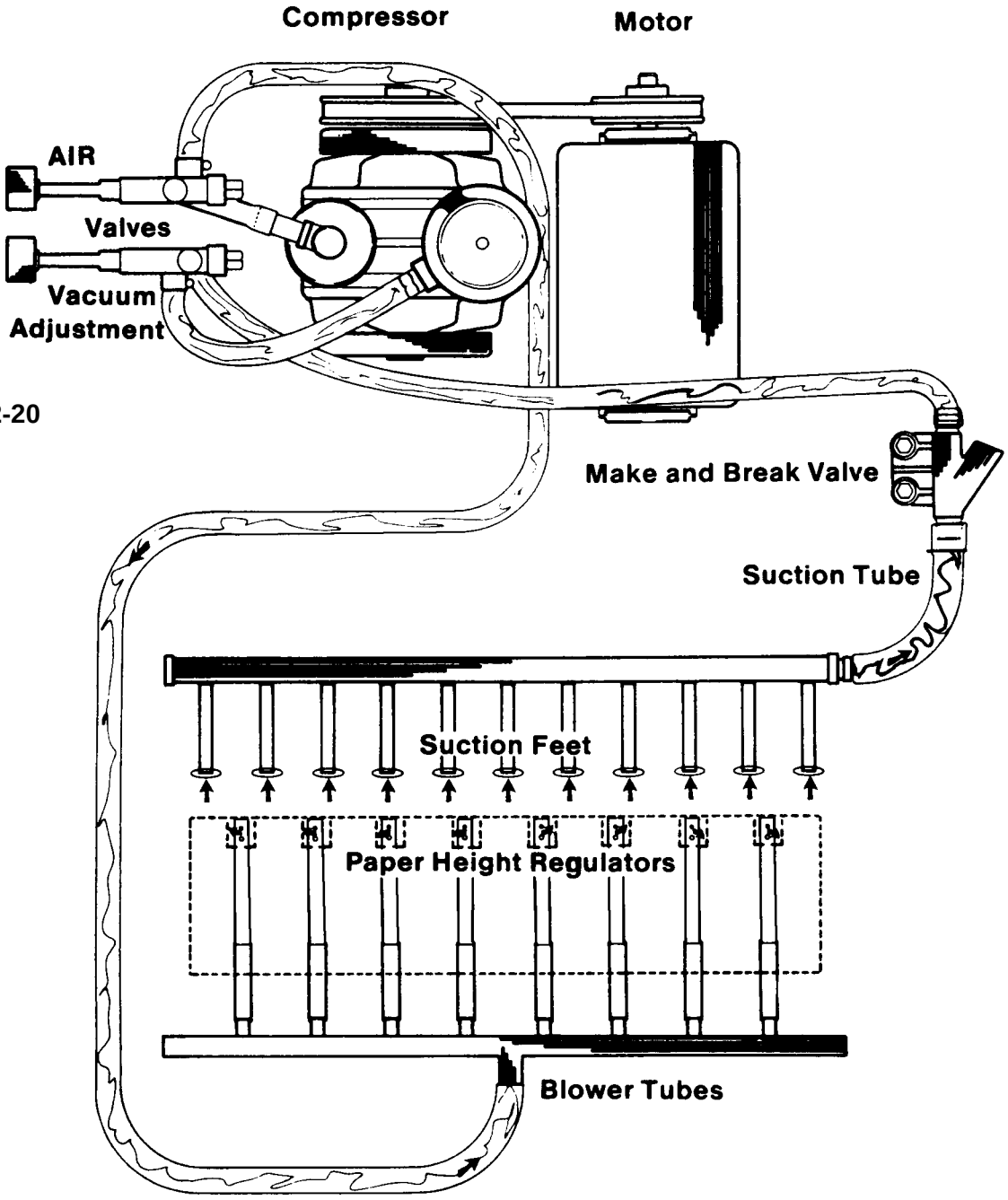


FIGURE 2-20

NOTES

SECTION 3

ELECTRICAL OPERATION AND TEST PROCEDURES

CONTROL BOX - LINE VOLTAGE INPUT CHANGES

The 9900 series machines are factory wired for 230vac, 60Hz. power input. All control boxes are equipped with a domestic 230vac-15A power service cord with black, white, green insulated conductors.

If changes are required for other than above, ex. 200vac, 220vac, or 240vac and 50 cycle operation, please see Fig. 22A below or sheet 1 of 8 of the schematics included in this manual. Note: These wiring detail's are called out on the decal located on the inside of the control box cover assembly.

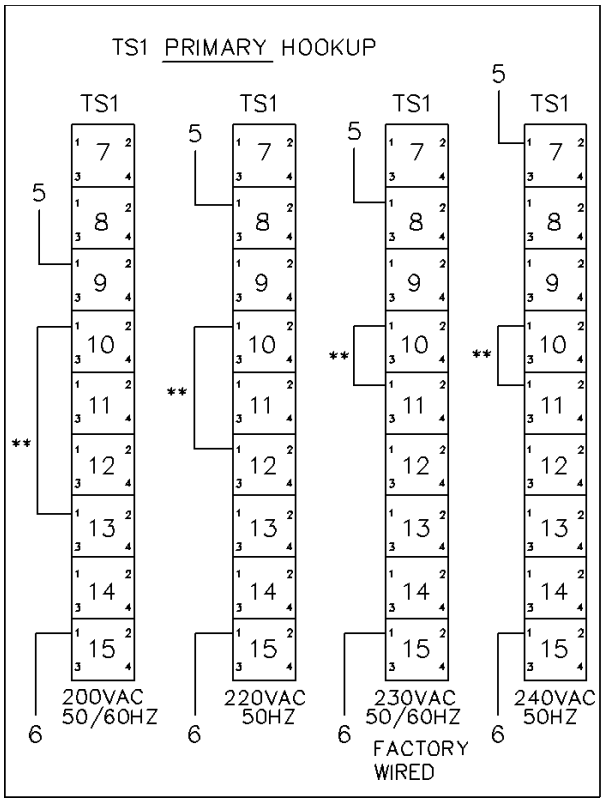


Figure 22A - TS1 Primary Hookup

NOTE:

If the machine/control box assembly is to be used on a 50Hz. power system (International units only), then the Domestic power service cord need's to be replaced with the International power service cord which is packed in the "packed unit", supplied with each machine. This cord complies with the International color code system, (brown, blue, green/yellow). A suitable hand-attached power plug will have to be purchased separately and applied to the end of the service cord. When changing this cord please note that the color code below:

FUNCTION	DOMESTIC	INTERNATIONAL
L1	BLACK	ROWN
L2	WHITE	BLUE
GROUND	GREEN	GREEN/YELLOW

Work-lamp power requirements:

The work-lamp receptacle is wired for 115vac operation at the factory. If 230vac operation is required (220-240v lamps) the following changes should be made to the power transformer assembly's terminal strip (TS1), located in the control box assembly. See Fig. 22B below and sheet 1 of 8 for the schematics located in this manual, for proper wiring details.

NOTE:

These wiring detail's are also called out on the decal located on the inside of the control box cover assembly.

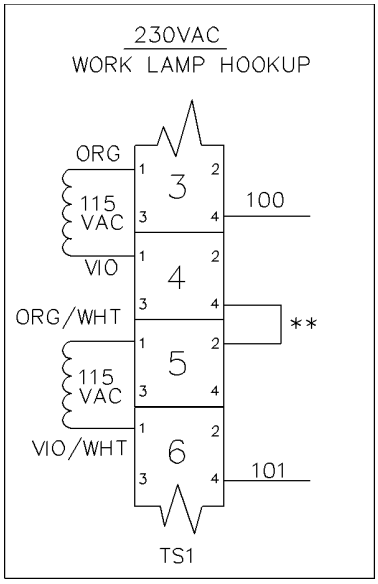


Figure 22B - 230VAC Work-lamp Hookup

PUMP MOTOR PULLEY CHANGE

The pump motor and pump located in the base of each machine is factory assembled for 60Hz. operation. For 50Hz. operation, (International units), the pump motor belt must be shifted to the inside pulley sheeves- no further adjustment is normally required.

ELECTRICAL COMPONENT TESTS

Sheet Count Setup Test

1. Depress the SHEET COUNT key.
   The display will read “SHT COUNT = (previous setting)”
   Depress “1”. Display will read “SHT COUNT = 1”.
   Depress “2”. Display will read “SHT COUNT = 12”.
   Depress “3”. Display will read “SHT COUNT = 123”.
   Depress “4”. Display will read “SHT COUNT = 1234”.
   Depress “5”. Display will read “SHT COUNT = 12345”.
   Depress “E”. Display will read “READY”.
2. Shut power off. After 3 seconds, turn it back on. Press the Guard Reset Switch. The display shall read “READY”.
3. Depress SHEET COUNT. Display will read “SHT COUNT = 12345”.
4. Depress “E”. Display will read “READY”.

Speed Set Test

1. Depress the Speed Key. The display shall show the previously set speed.
2. Set the speed to 5000 IPH. Depress “E” to enter the speed.
3. Push the Drive Key to start the Drive Motor.
4. When the Drive Motor reaches 5000 I.P.H., the display shall read “SPEED = 5000”.
5. While the display shows “SPEED = 5000”, depress the “3” Key. The display shall read “SET SPEED 3”. Press the “0” Key three times then push “E” to enter the speed. The speed shall decrease to 3000 IPH.
6. The display shall read “SPEED = 3000”.
7. Depress the Stop Key to stop the machine.

Feed, Proof and Alternate Feed Test

1. Push the Drive Key. With the machine running, push the Proof Switch on the Chain Delivery. The display shall read “PROOF“ and one sheet will be fed.
2. Push the Feed Key. The feed solenoid and the pump motor will engage. The machine will start feeding and counting.
3. Push the Feed Switch on the Chain Delivery. The machine shall stop feeding and the pump shall turn off. Push the Feed Switch again, and the machine starts feeding and counting.
4. Alternate Sheet Feed Test: Place the Single Lever Control in the Feed Position and bring it back to the Image Position. The machine will start feeding every other cylinder revolution. Move the lever to the Ink Position. The machine will feed with each revolution.

Emergency Switch Test

1. While the machine is running, push the Emergency Stop Switch. The machine shall stop immediately, the display shall read “EMERG. SWITCH TROUBLE” and the Alarm Light shall flash.
2. Release the Emergency Switch. The Alarm Light shall turn off and the display shall read “PUSH DRIVE”.
3. Push DRIVE. The machine shall run at Set Speed.

Jam Test

1. Create a misfeed: Press the Feed Key so the machine starts feeding. Stop the paper from being fed. After four consecutive misfeeds, the display shall read “MISFEED, PSH C” and the feed will be off.
2. Push “C”. The display shall read “COUNT XXXX”.
3. Push the Feed Key. The machine shall start feeding again.
4. Create an input jam: Stop the paper at the Input Sensor. The display shall read “CLEAR INPUT JAM”. The FEED and PUMP will be OFF and the machine will STOP.
5. Clear the input jam and push “C”. The display shall read “PUSH DRIVE.
6. Push DRIVE. The machine shall run at set speed.
7. Push the Feed Key and the machine will start feeding again.
8. Create an output jam: Push the Stop Key to stop the machine. Cover the output sensor.
9. Set the machine speed to 4000 IPH. Push the jam Off Key. The Jam Off LED shall come on. Push the Drive Key and then Push the Feed Key. The machine shall start feeding paper.

   After a few sheets are fed push the Jam Off key. The jam Off LED shall turn off. The FEED and PUMP shall turn off and the machine shall stop. The display shall read “CLEAR OUTPUT JAM”.
10. Open the guards. Clear the output jam and close the guards.
11. Push the Guard Reset Switch. The display shall read “CLEAR OUTPUT JAM”.
12. Push “C”. The display shall read “PUSH DRIVE”.
13. Push the Drive Key and the machine shall start.
14. Push the Feed key and the machine shall start feeding again.

Doubles Test

1. While the machine is feeding, rotate the Doubles Detect Knob counterclockwise until the Doubles Detector is engaged. The Alarm Light shall go on and the display shall read “CLEAR DOUBLE”. The machine shall stop feeding but still run.
2. Rotate the Doubles Detect Knob approximately 1/4 clockwise. Push “C”. The display shall read “COUNT XXXX”. Repeat Step 1 if necessary.
3. Turn off the feed and drive.

Sheet Count and Totals Test

1. Clear the daily total: Push the Stop Key, then "1". The display shall read "DAY SHT = XXXXX". Push "C". The display shall read "DAY SHT = 0". Push "E" to return to the ready state.
2. Record the cumulative total: Push the Stop Key, then "2". The display shall read "TOTSHT = XXXXXX". Record this value then push "E" to return to the ready state.
3. Set the sheet count to 50.
4. Push the Drive Key to start the machine. The display shall read "COUNT = 50".
5. Push the Feed Key. The machine shall feed and count down.
6. When the count reaches 30, push the Sheet Count Key. Enter a value of 75. Push "E" to enter the value.
7. The machine shall calculate the number of sheets left as equal to 75 minus the number of sheets already printed. The display shall read "COUNT = XXXX" with XXXX being the number of sheets left.
8. The machine will count down to 0. Paper feed will turn off and the display shall read "COUNT = 50".
9. Push the Stop Key to stop the machine. The display shall read "READY".
10. Push the Stop Key followed by "1". The display shall read "DAY SHT = 75". Push "E" to return to the ready state.
11. Push the Stop Key followed by "2". The display shall read "TOTSHT = XXXX" XXXX shall be 75 plus the total recorded at the beginning of the test. Push "E" to return to the ready state.

Guard Bypass Service Switch Test

1. Pull the Service Switch Shaft out. This shall engage the switch, which shunts all guard switches.
2. With the Drive Motor on, lift all the guards, one after another. No LED's shall come on. No Guard Reset Light. The motor shall not stop.
3. Depress the DRIVE Button. The motor shall stop.

WARNING:

WHEN POSSIBLE WHILE SERVICING THE MACHINE WITH THE GUARD BYPASS SERVICE SWITCH ENGAGED, KEEP THE EMERGENCY STOP SWITCH DEPRESSED AS A SAFEGUARD.

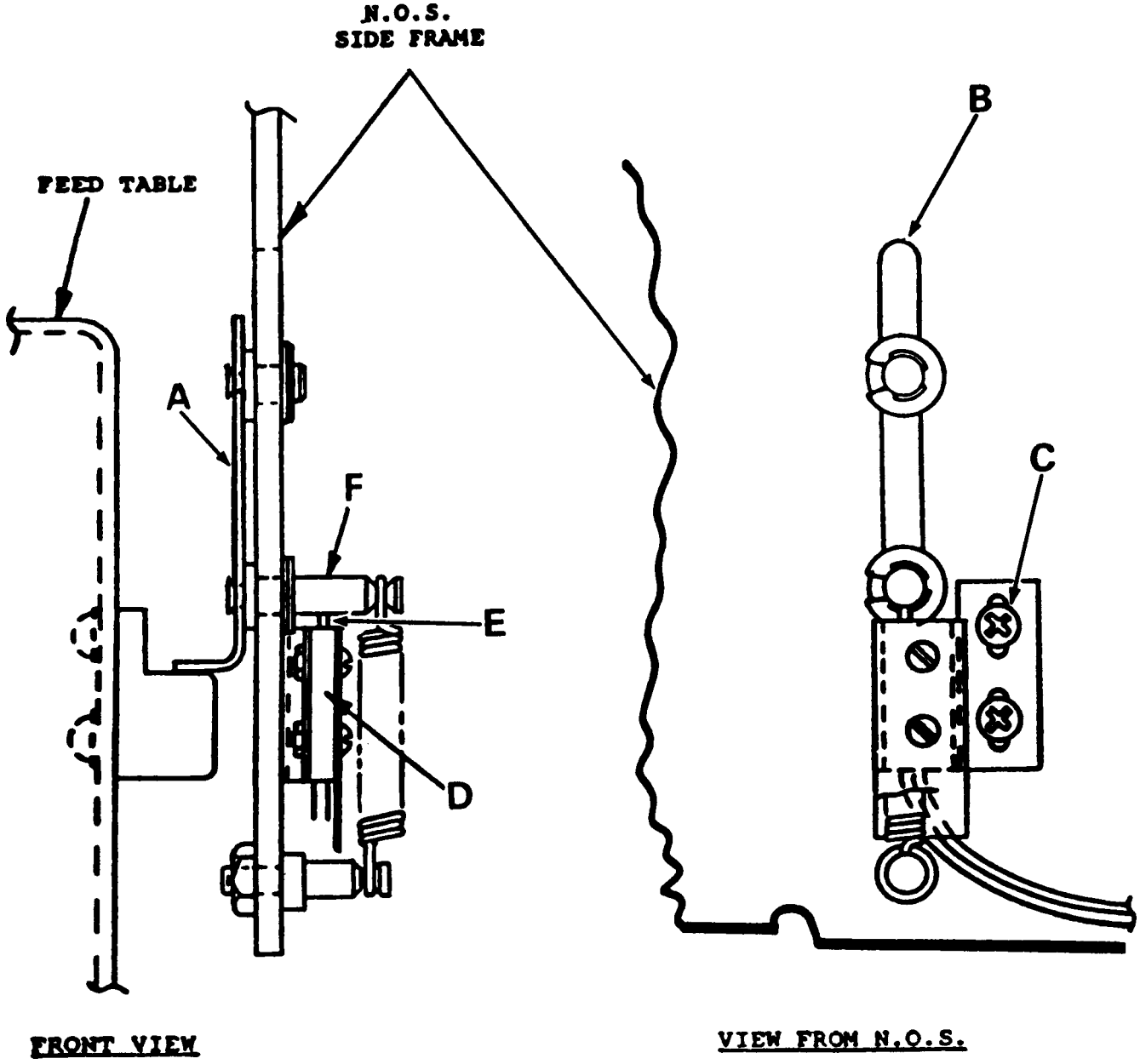


FIGURE 3-1

CALIBRATION PROGRAM

The Calibration Program is used to enable various machine functions for a technician to make some calibrations and adjustments.

To enter the Calibration Program, depress the Stop Key. Then, press the "JAM OFF" key, followed by the “4” Key. The program will perform its functions in the sequence shown in this section. To exit the program press the STOP key. This will return the machine to “READY”.

Low Paper Sensing Switch

1. The Main Power Switch should be ON. If the Alarm Light is flashing, press the Guard Reset Button. The display should read “READY”.
2. Enter the Calibration Program as described above. Push "E" on the keyboard. The display will read “CALIBRATION”.
3. Ensure that the Slide Assembly (A) is resting in the bottom of the slot (B) in the non-operator side frame. (Figure 3-1)
4. Loosen the two screws (C) and position the switch (D) so the actuator pin (E) is approximately in the center of the stud (F) and is depressed to actuate the switch. Tighten the two screws (C).
5. There must be some clearance between the stud (F) and the switch body for the stud to rest in the bottom of the frame slot (B). Readjust if necessary.

NOTE:

The Low Paper Sensing Switch is a Magnetic Reed Switch and actuation cannot be detected by feel or sound.

6. Lift the Slide Assembly by hand to de-actuate the switch. The Alarm Light shall flash and the display should read “LOW PAPER TEST”.
7. Release the slide and the Alarm Light will go out. The display will read “CALIBRATION”.

Chain Delivery Test

1. Push “E” on the Keyboard.
2. Lower the Receiving Dolly on the Chain Delivery until the display reads “CHAIN DELVY FULL”.
3. Raise the Dolly slowly. The display shall read “CALIBRATION”.

Clock and Sync Wheel

1. Push “E” on the keyboard.
2. The display shall read "SYNC & CLOCK = ". Turn the handwheel slowly counterclockwise until the display reads “SYNC & CLOCK = 1”, then continue turning. It shall count and display as each clock magnet passes over the Hall Effect switch. Count is reset to 0 by the sync sensor. The system will count through only one revolution.
3. After testing, press “C” and the display shall read “CALIBRATION”.

Paper Input Sensor

1. Push “E” on the keyboard.
2. The display shall read “CALIBRATION”. The Pump Motor and Feed Solenoid shall come on. Turn the handwheel to feed paper and trip the Paper Input Sensor. The Alarm Light will blink and the display shall read “PAPER DETECT TEST”. Advance the paper between the cylinders and leave it there.
3. Push “C” so the Alarm Light goes out and the display reads “CALIBRATION”. The Pump Motor and Feed Solenoid shall go off.

Doubles Detector Switch Adjustment

1. Push “E” on the keyboard.

   The display shall go blank. There should still be paper in between the cylinders.
2. Rotate the Doubles Detector Knob counterclockwise until the Doubles Detector Switch is engaged. The Alarm Light shall blink and the display shall read “DOUBLES TEST”.
3. Rotate the Doubles Detector Knob approximately 1/4 turn clockwise. The Alarm Light must go off and the display must go blank. If not, turn the knob 1/4 turn clockwise again until they do.
4. Push the “C” key. The display shall read “CALIBRATION”.

DC Motor Speed Control Calibration

If the maximum or minimum speeds are not satisfactory, if the controls have been repaired, or if the user wants any changes made, the Speed Control PC Board pots can be adjusted as follows:

WARNING:

USE A NONMETALLIC SCREWDRIVER TO ADJUST THE TRIM POTS SO THE SCREWDRIVER BLADE CANNOT SHORT THE CIRCUIT BY CONTACTING LIVE CIRCUITRY, AND TO PREVENT ANY CONTACT WITH DANGEROUS OR FATAL VOLTAGES.

1. Set the MAX SPEED (Maximum Speed) trim pot on the Speed Control Board to the full clockwise position. (Figure 3-2)
2. Set the MIN SPEED (Minimum Speed) trim pot to full counterclockwise position.
3. Make sure the Module Voltage Select Switch is at the right (230V) position. (This applies to Leeson Boards ONLY).
4. Push the “E” key on the keyboard. Push the “Drive” key.
5. Adjust the R4 potentiometer on the EPOT board until the speed shown on the keyboard display reads between “SPEED = 10,000” and “SPEED = 10,300”.
6. Push the Stop Key to stop the motor. The display will read “READY”.

NOTE:

Under no circumstances are the "IR" and "CL" trim pots on the speed control to be adjusted from their factory settings.

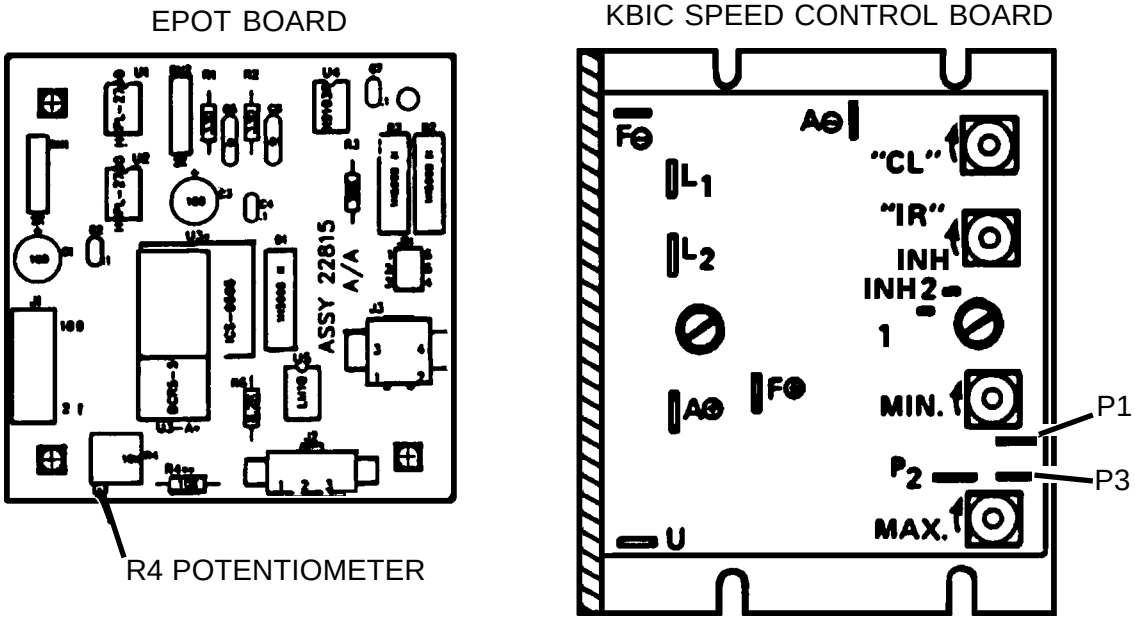


Figure 3-2

DIAGNOSTICS PROGRAM

The Diagnostics Program is used to enable various machine functions for troubleshooting.

The Diagnostics Program is entered by depressing the Stop Key followed by the “3” Key. The program will perform its functions in the sequence shown in this section. If a function is not needed, press the “E” key to go on to the next function until you reach the one you need. To exit the program, press the “C” key at any time during testing.

Membrane Switch Panel

1. The display should read “READY”. Enter the Diagnostics Program as described above. The display will read "CHECK KEYS".
2. Each switch on the panel, when depressed, will cause the display to read that key’s function. The Feed and Proof Switches on the Chain Delivery can also be tested.
3. To proceed to the next Test press the “E” key. To exit diagnostics press the “C” key.

Display

1. The LCD will display all letters, numbers, and symbols in its character set. A group of characters will be displayed for three seconds before progressing to the next group. Pressing the STOP key will stop the sequence from progressing. Pressing the SPEED key will cause the sequence to continue.
2. To proceed to the next test press the “E” key. To exit diagnostics press the “C” key.

Motors

1. The Drive and Pump Motors will be activated one at a time, in sequence. Pressing the STOP key will stop the sequence from progressing, and leave the same motor on. The Pump motor will cycle 3 seconds on, and 3 seconds off, and the Drive Motor will stay on continuously. Pressing the SPEED key will cause the sequence to continue.
2. To proceed to the next test press the “E” key. To exit diagnostics press the “C” key.

Feed Solenoid and Impression Solenoid

1. The Feed Solenoid will be activated 3 seconds on and 3 seconds off.
2. To proceed to the next test press the “E” key. To exit diagnostics press the “C” key.

Sensors

1. The following sensors will be monitored: Sync, Clock, Jam, Doubles Detect, Low Paper, Guards, Paper Detect, Chain Delivery Full, Speed UP Switch, Speed DOWN Switch, and Operation Control Handle (Neutral, Ink, and Image positions). Detection of an active state shall read on the display.
2. Activate the sensors one at a time to ensure they are working.
3. Depression of the “C” key will exit the Diagnostics Program and return the machine to the “READY” state. Depression of the “E” key will return testing to the Membrane Switch Panel Test.

SECTION 4

DISASSEMBLY/ASSEMBLY

GENERAL DISASSEMBLY/REASSEMBLY INSTRUCTIONS

This section provides you with instructions on how to remove or disassemble various parts of the duplicator. Many technicians find it helpful to refer to the Parts Catalog, using it as a guide for taking apart and reassembling machines to get at parts and assemblies not discussed in this chapter.

Follow these guidelines when disassembling or reassembling a machine:

1. Do not attempt to disassemble too many parts of the machine the first time you disassemble a machine. If possible, use a progressive disassembly plan, removing and replacing more parts each time.
2. Before removing any part, note where any springs or electrical connections are attached. Leave one end of a spring attached when possible.
3. When possible, set aside the parts in correct order as you disassemble, to ease reassembly.
4. When reassembling you can refer to:
   a. This section
   b. The Wiring Harness and the Component Location Diagrams in the last section of this manual
   c. The 9970 Parts Catalog

   Check these sources BEFORE you take apart the machine, to make sure the information you will need is available.
5. Take notes during disassembly if the sources in step 4 are unclear or incomplete.

NOTES

MASTER CYLINDER

Removal

NOTE:

The Master Cylinder should be protected with a Clean-Up Mat.

1. Remove the Aquamatic Trough (A). (Figure 4-1)
2. Remove the Master Cylinder Gear Guard (B). (Figure 4-1)
3. Remove the Switch Mounting Bracket (C) on the non-operator side, and then remove the Reed Switch and cover (D). (Figure 4-1)
4. Remove the screws and nuts (E), two (2) on the non-operator-side, one (1) on the operator-side. (Figure 4-2)
5. Loosen the nuts (F) on both sides of machine. (Figure 4-2) . Remove the Aquamatic Control Handle (G), screw, and stud.

NOTE:

The Aquamatic Assembly should now be tilted up.

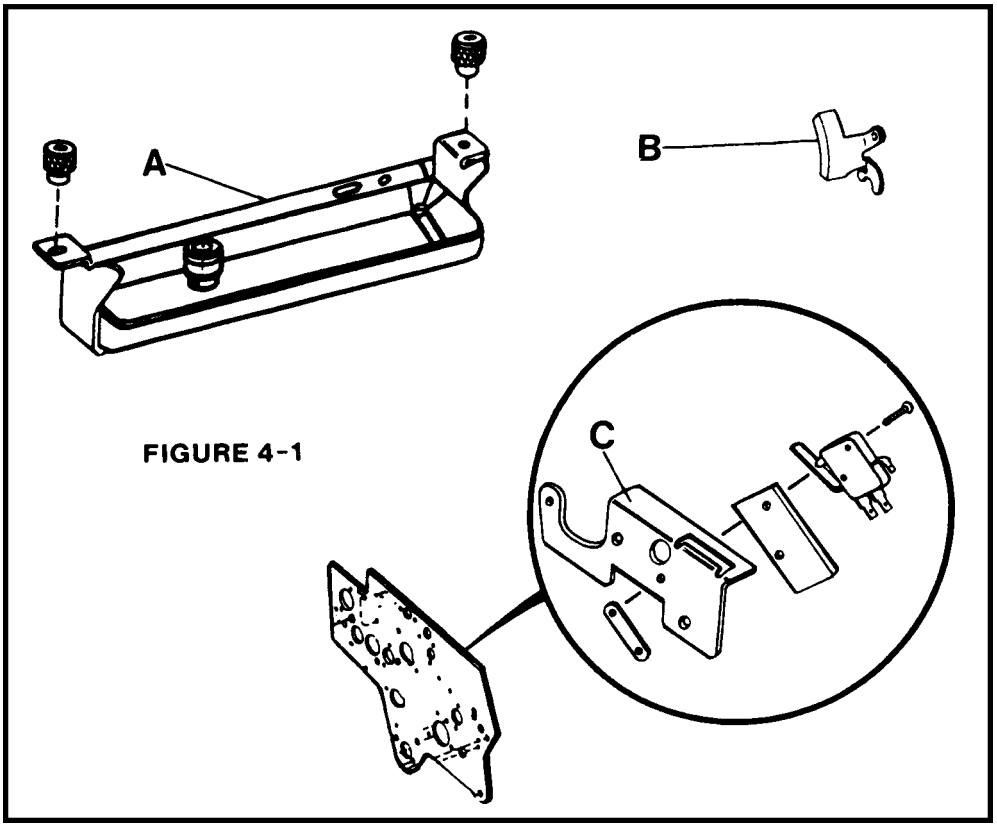


FIGURE 4-1

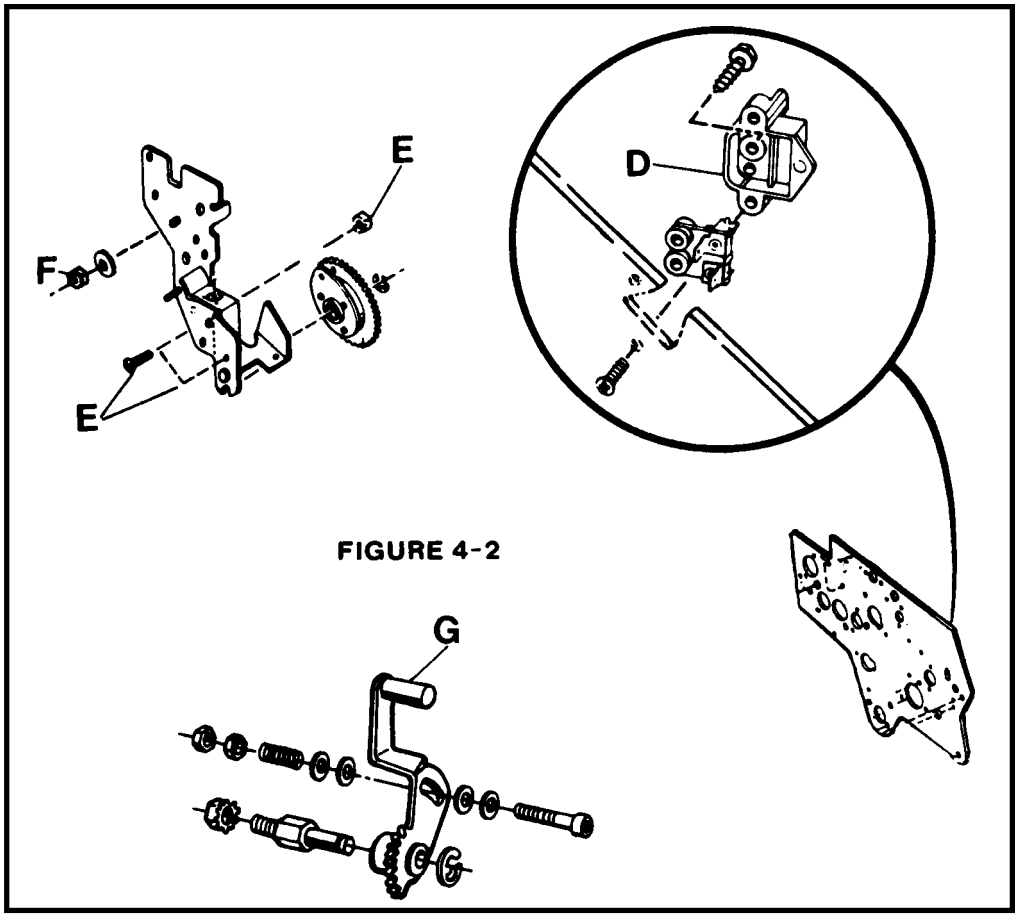
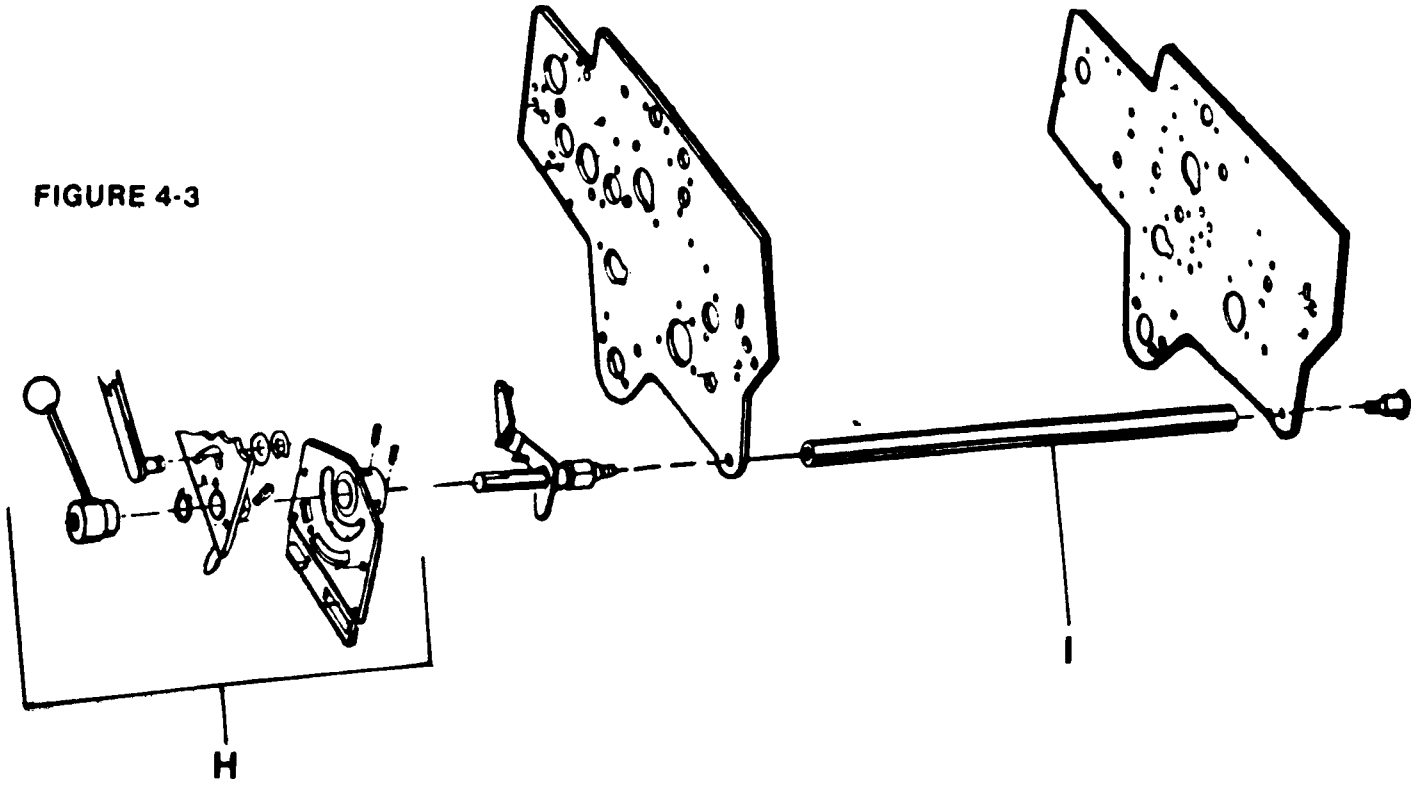


FIGURE 4-2

7. Remove the Operation Control Handle, Cam and PCB Assembly (H). (Figure 4-3)
8. Remove the Upper Tie Bar (I).
9. Remove the Master Cylinder Latch (J). (Figure 4-4)
10. Remove the Master Cylinder Lever (K).
11. Remove the Master Cylinder Power Lever (L).

FIGURE 4-3



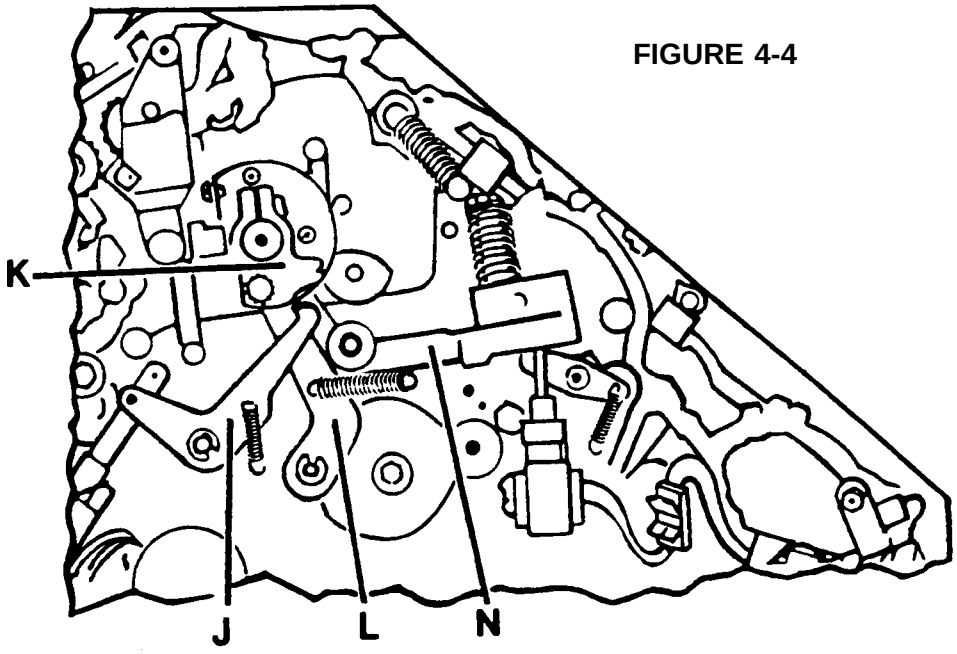


FIGURE 4-4

12. Loosen the set screws and remove the collar (M) on the non-operator side. (Figure 4-5)
13. Remove the Support Arm Assemblies (N), one from each side. (Figure 4-4)
14. Remove the Master Cylinder Shaft.
    a. Remove the Master Cylinder Shaft Bearings (0), one from each side. (Figure 4-5)
    b. Install the Cylinder Adjusting Tool (P/N 191551).
    c. Loosen the collar (P) located inside the Cylinder. Remove the two set screws completely.
    d. Pull out and remove the Master Cylinder Shaft (Q) from the operator side.

NOTE:

If loose, replace the Tru-Arc located on the Shaft.

15. Remove the Master Cylinder (R).

Installation

Install the Master Cylinder in the reverse order of removal. Note the following during installation:

1. The beveled end of the collar (M) must face the operator side of the machine, and the set screws must bottom in the holes in the shaft.
2. Refer to Section 5 pages titled: "Machine Timing", "Final Master and Impression Cylinder Support Arms", and "Master Cylinder Clamp" to time the Master Cylinder and to perform the Master Cylinder Parallel and Pressure Adjustments.
3. Refer to Section 5: "Single Lever Control Detent, Eccentric Discs, and Hall Effect PC Board" to adjust the Operation Control Lever.

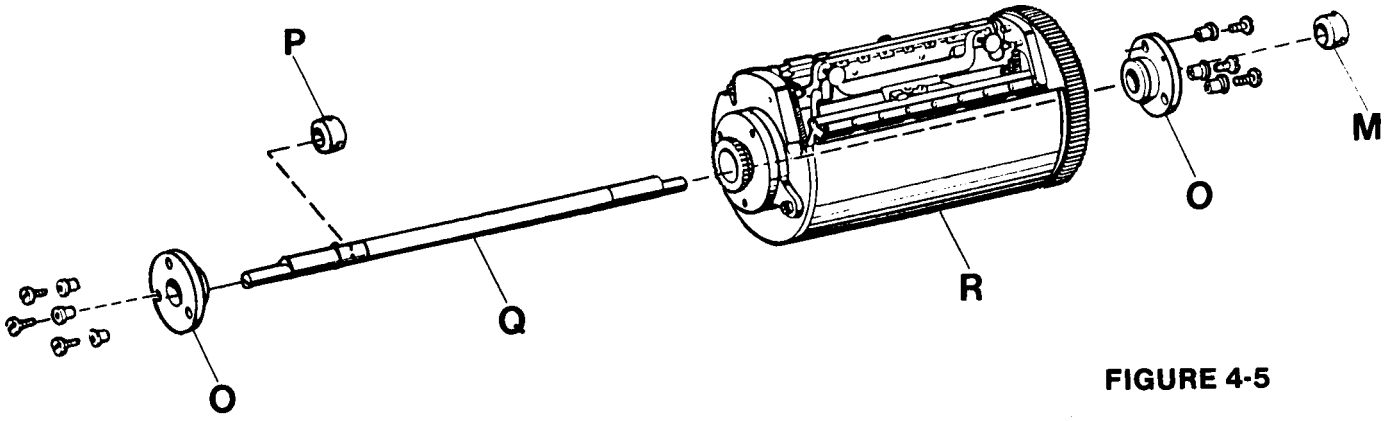


FIGURE 4-5

BLANKET CYLINDER

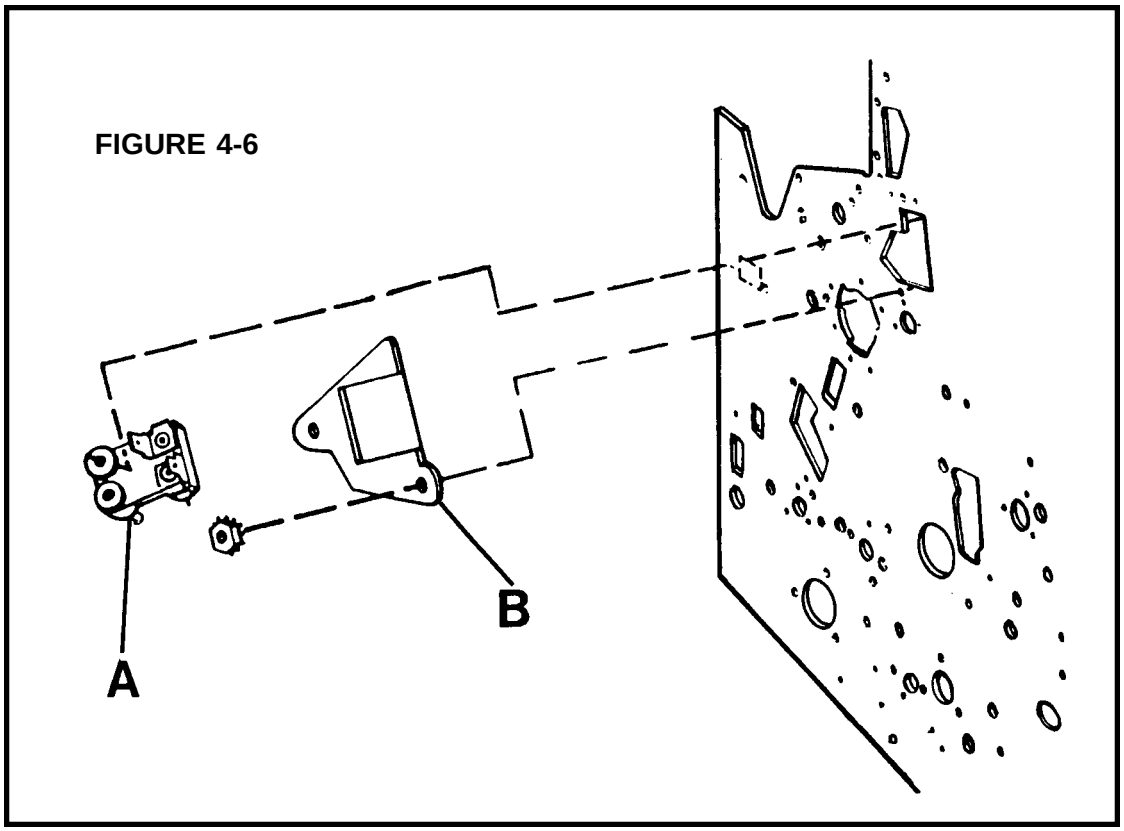
Removal

NOTE:

Protect the Blanket Cylinder with an old Blanket and the Master and Impression Cylinders with Cleanup Mats while doing this procedure.

1. Remove the keyboard, operator side cover, and Master Cylinder Safety Cover.
2. Remove the Safety Switch (A) and its cover (B). (Figure 4-6)

FIGURE 4-6



3. Remove the Operation Control Lever, Cam, and PCB Assembly (C). (Figure 4-7)
4. Remove the operator side cam (D), key (E), and collar (F). (Figure 4-8)
5. Remove the Blanket Cylinder Pilot Screw (G).
6. Remove the Raise-Lower Plunger (H) by removing the screws and nuts shown.
7. Remove the Blanket Cylinder Bearing and Housing (operator side). Remove three screws and nuts (I) as shown. Do not remove the bearing from housing.
8. Remove the Lower Tie Bar (J).

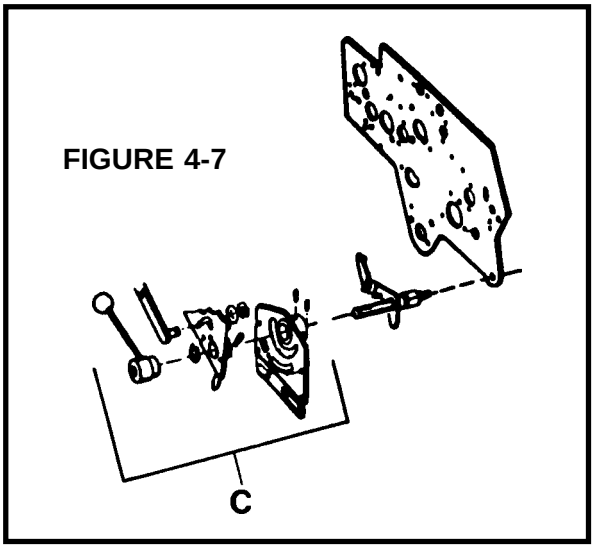


FIGURE 4-7

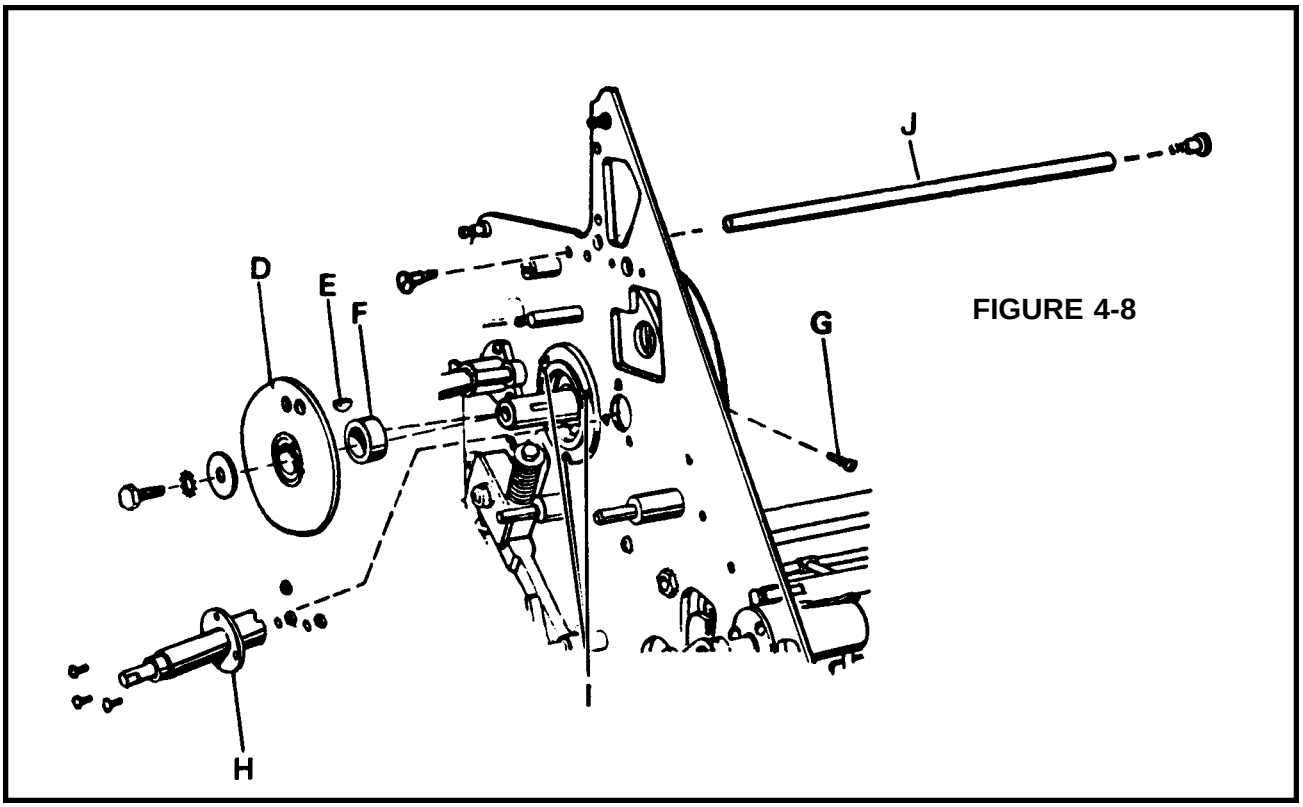


FIGURE 4-8

9. Remove the Master Cylinder Support Arm Bolts (K). (Figure 4-9)
10. Move the Stop Blocks (L) so that the pins are out of the side frame. Push the Support Arms down.
11. Remove the Blanket Cylinder Shaft from the operator side. Install the Shaft Pulling Tool (P/N 191573), on the operator end of the shaft (M) as shown. (Figure 4-10)
12. Remove the Blanket Cylinder from the machine.

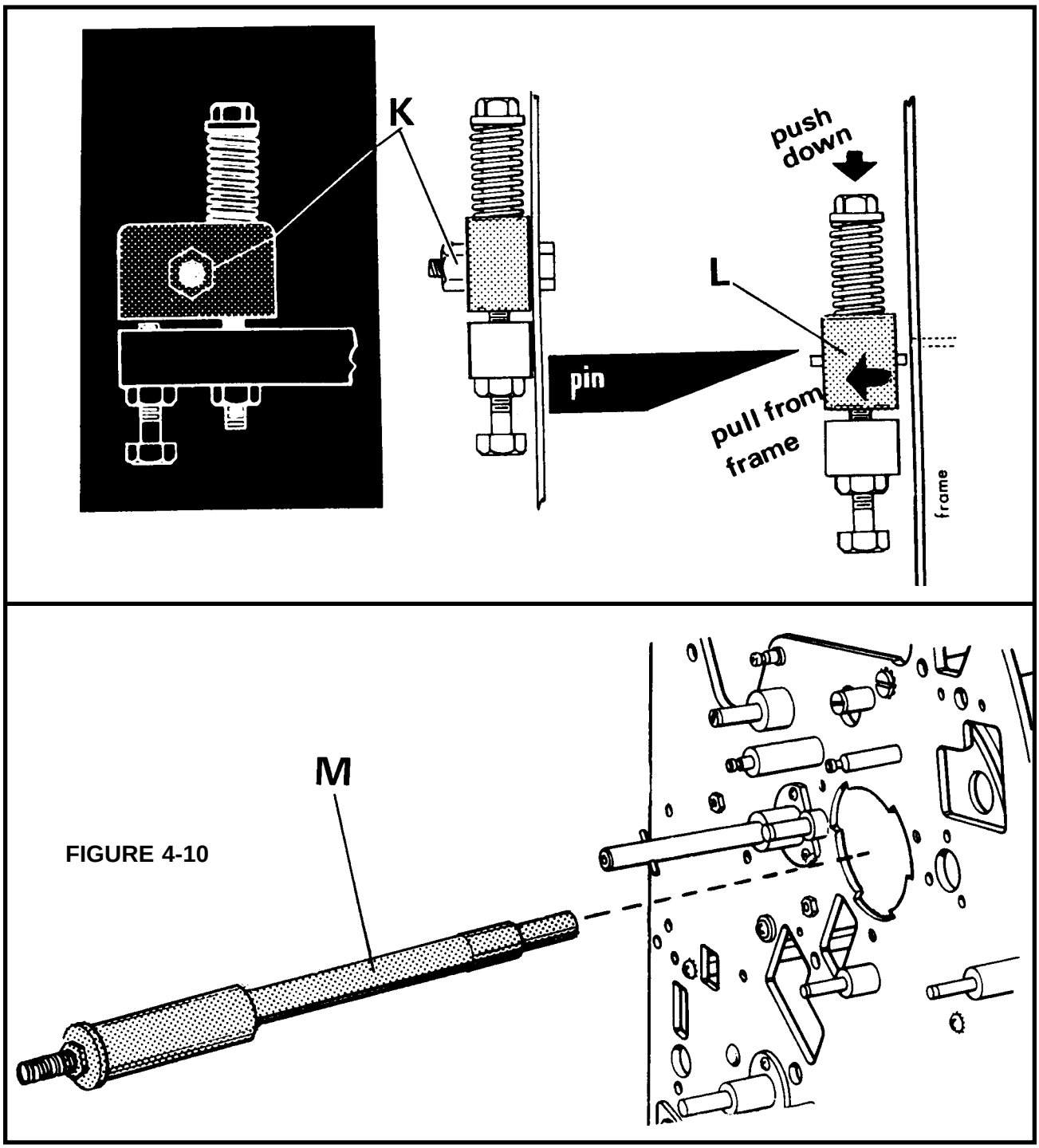


FIGURE 4-10

Installation

Install the Blanket Cylinder in the reverse order of removal. Note the following during installation:

1. Set the Raise-Lower at “0.”
2. When installing the cam, the double holes in the operator and non-operator side cams should line up. The pilot screw should be installed once the holes are lined up. (Figure 4-11)
3. Refer to the timing adjustment to time the Blanket Cylinder.

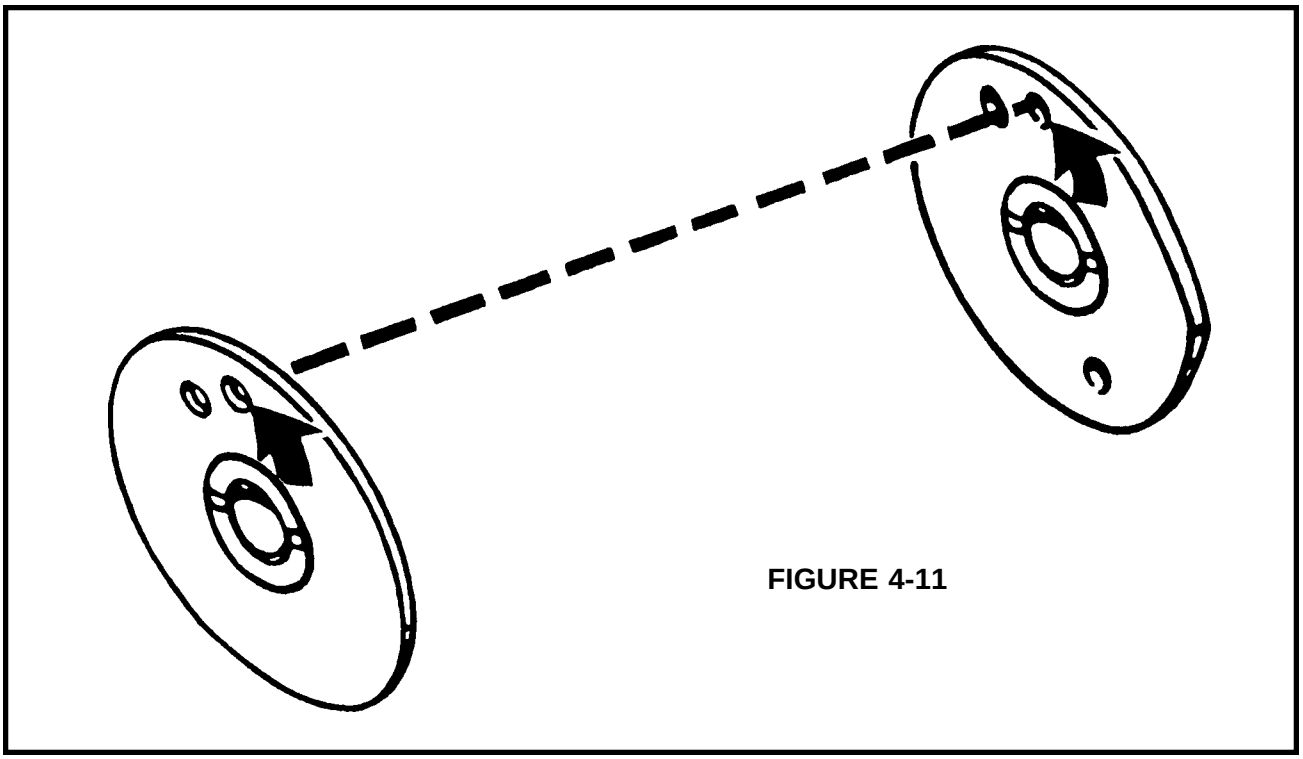


FIGURE 4-11

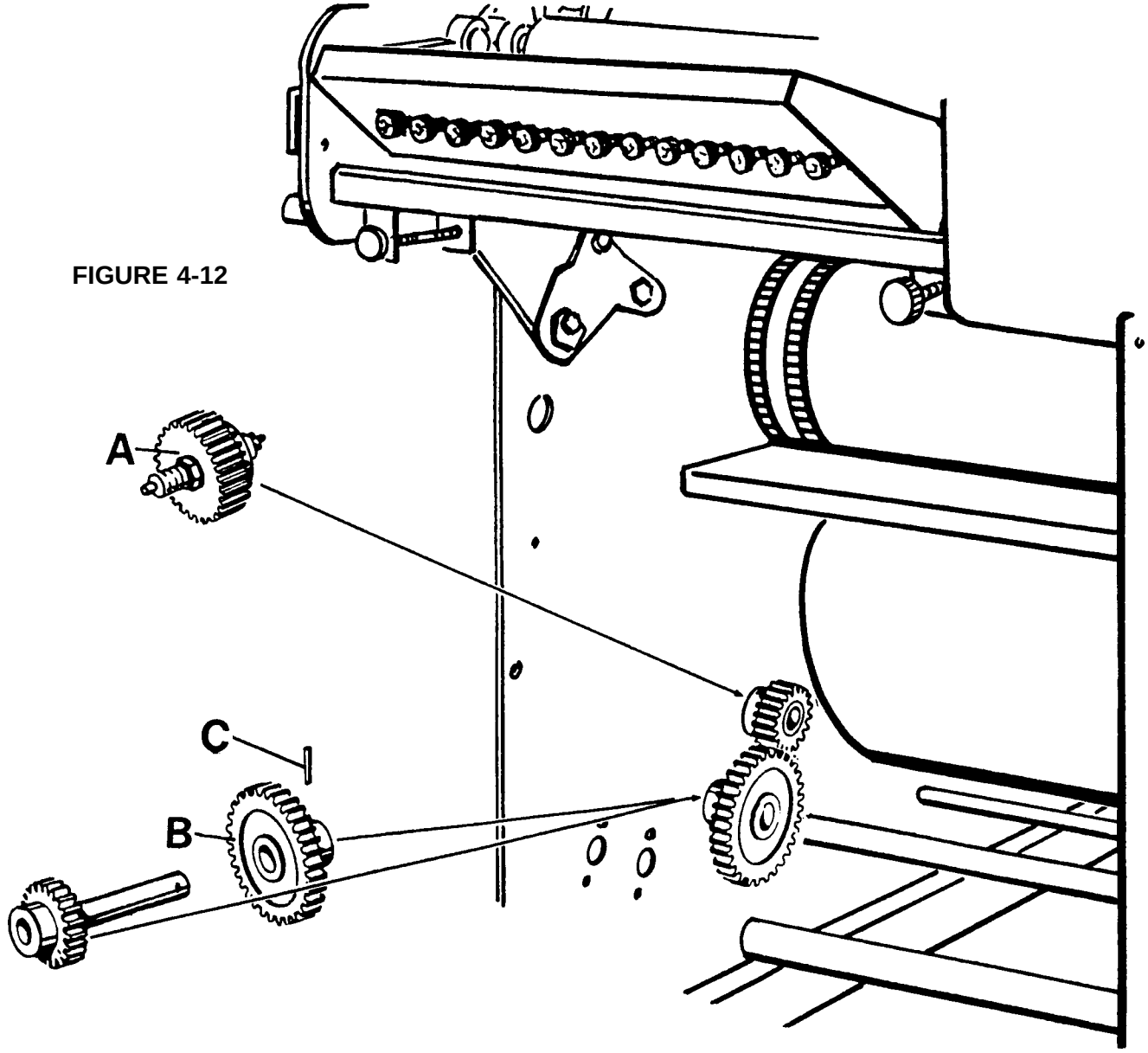
IMPRESSION CYLINDER

Removal

NOTE:
The Impression Cylinder should be protected with a Cleanup Mat.

1. Remove the Auxiliary Form Roll Assembly, keyboard and side covers.
2. Remove the Chain Delivery Unit as described in next Section: "Chain Delivery".
3. Remove the gear (A) and stud. (Figure 4-12)
4. Remove the compound gear (B) — do not remove both pins, remove only the pin (C) shown.

FIGURE 4-12



5. Remove the Master Cylinder Link (C). (Figure 4-13)
6. Remove the Counter Operation Lever (D).
7. Remove the necessary linkage (E) to gain access to the Impression Cylinder Support Arm.
8. Remove the Impression Cylinder Lever (F), located on the non-operator side. (Figure 4-14)
9. Remove the operator and non-operator side Support Arms (G). (Figure 4-13)

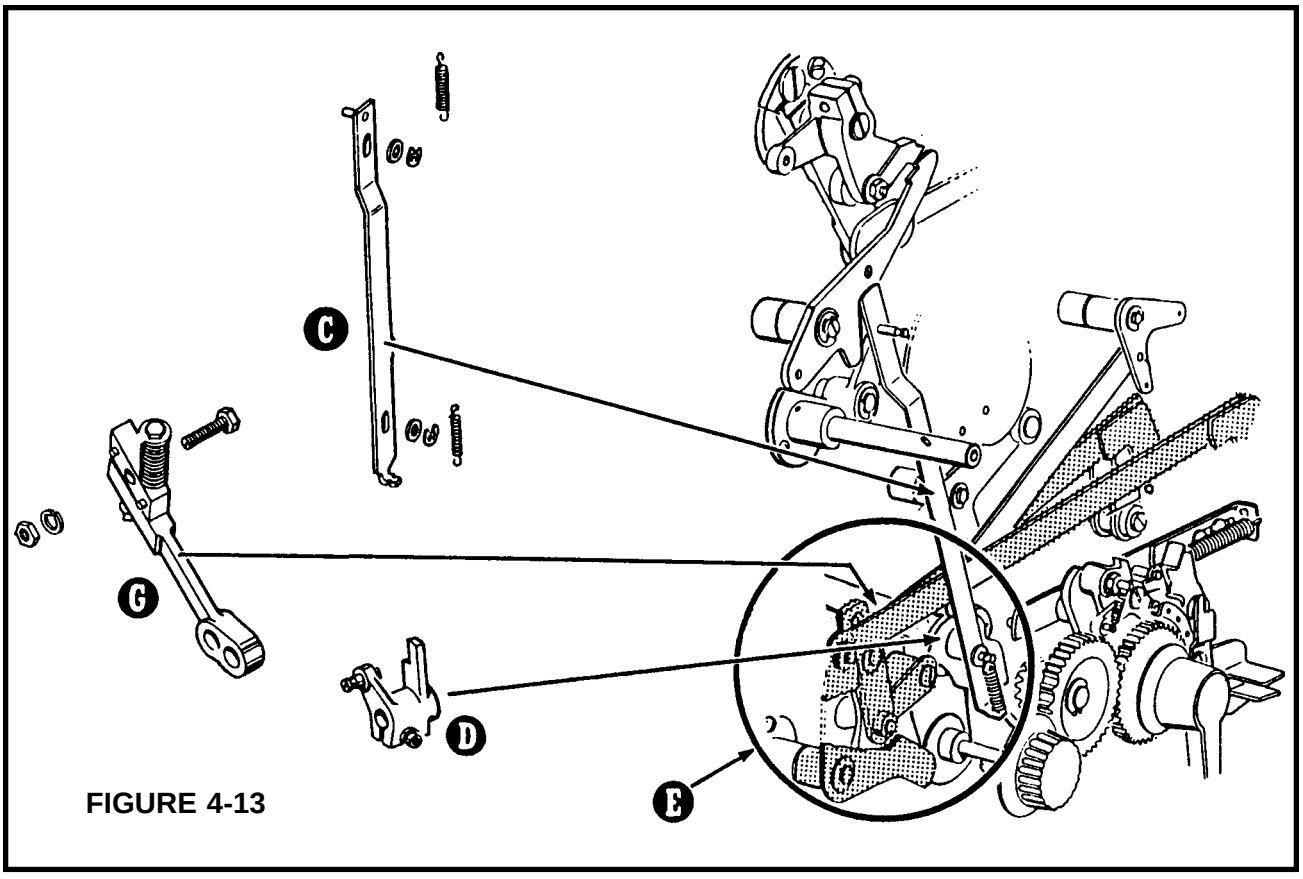


FIGURE 4-13

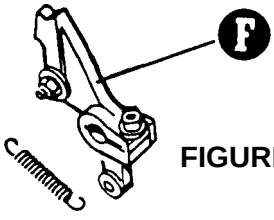


FIGURE 4-14

10. Install the Cylinder Adjusting Tool (P/N 191551).
11. Completely remove the two set screws (I) from the collar (J) located inside the Impression Cylinder (K). Remove the “C”-Ring (L) located on the Impression Cylinder Shaft (M). (Figure 4-15)
12. Remove the Impression Cylinder Shaft (M) from the operator side.

Installation

Install the Impression Cylinder in the reverse order of removal. Note the following during installation:

1. Install the collar (J) inside the Impression Cylinder with the beveled end facing the operator side.
2. Install the heavier of the two springs on the bottom of the Master Cylinder Link (D).

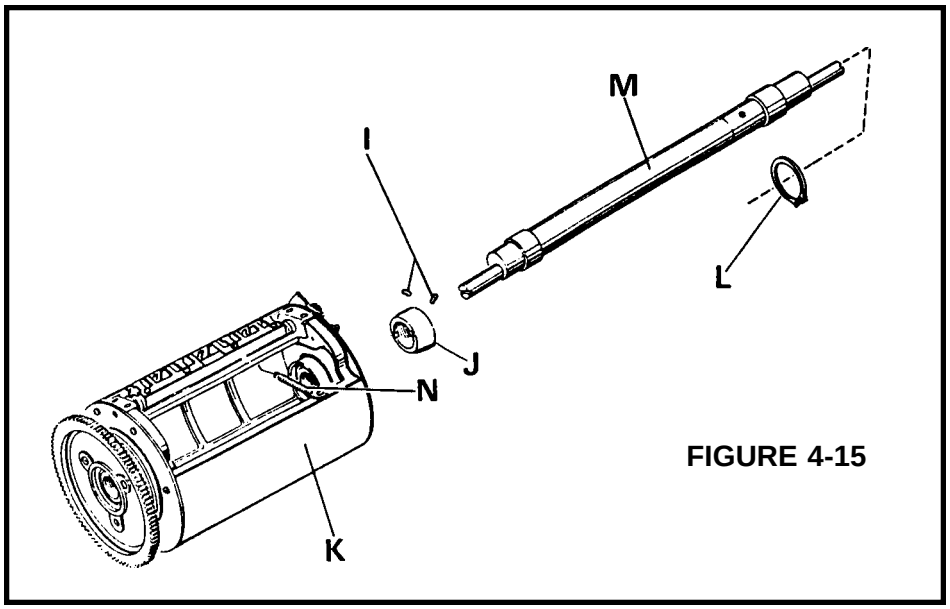


FIGURE 4-15

CHAIN DELIVERY

Removal

NOTE:
The machine should be in time before removing the Chain Delivery, and the Impression Cylinder should be protected with a Cleanup Mat.

1. Remove the following:
   a. Upper operator side cover
   b. Lower operator side cover
   c. Upper non-operator side cover
   d. Chain Delivery covers (both sides)
   e. Dolly
2. Position the paper stop all the way back (towards the receiving end).
3. Remove the Paper Guides (A). (Figure 4-16)

NOTE:
For easy removal of the Paper Guides, position the Gripper Bars so one is directly over another, and the third is in the Impression Cylinder

4. Remove the three Gripper Bars.
5. Release the pressure on both chains.
6. Remove the master link on one of the chains. Firmly grasp the chain with your left hand and use your right hand to slowly rotate the handwheel in a clockwise direction to carefully remove the chain.
7. Repeat Step 6 for the remaining chain.

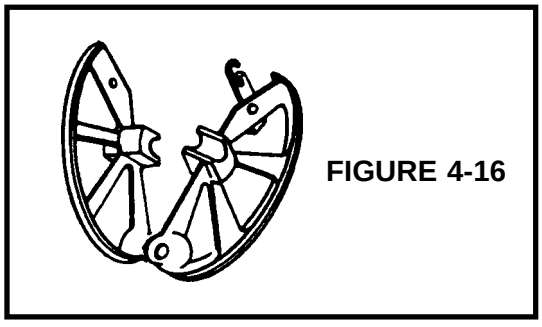


FIGURE 4-16

8. Cut the wire ties and remove the strain reliefs from the non-operator side wiring harnesses.
9. Remove the Chain Delivery Interlock wiring from the in-line splices.
10. Disconnect the Jam Detect, photoreceptor, and Full Dolly Sensor connectors.
11. Cut the tie wraps on the machine tie bar.
12. Remove the five strain reliefs (B) (4 outside, 1 inside) that secure the Auxiliary Feed and Proof Switch Wires. Remove the wires from both sides of the Chain Delivery by routing them through the side of the machine. Position the wires to the side and let them hang. (Figure 4-17)

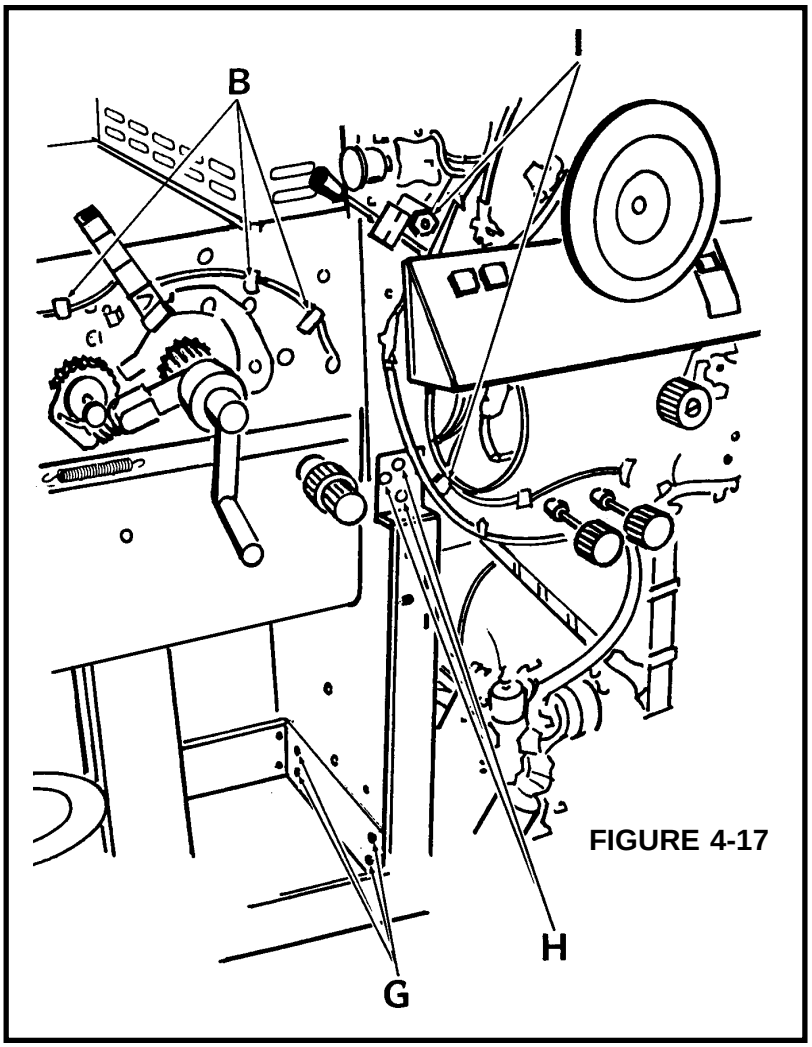


FIGURE 4-17

13. Remove the Tru-Arc Ring (C) from the stud (D). Remove the stud (D). (Figure 4-18)
14. Remove the Tru-Arc Ring (E) on the Sprocket Bar Shaft, and slide the cam (F) toward the non-operator side.
15. Remove the lower four bolts (G). (Figure 4-17)
16. Remove the four bolts (H) (2 on each side) on the midsection support (L-shaped) brackets.
17. Remove the four remaining bolts (I), upper and lower, on each side and remove the Chain Delivery. The Sprocket Shaft Assembly will remain in the machine.
18. Remove the 1/2" bolt from the end of the Sprocket Shaft on the non-operator side.
19. Remove the taper pin on the Sprocket Gear (non-operator side) and slide the gear toward the operator side. Take care not to damage the Impression Cylinder.
20. Remove the three nuts and bolts that secure the Sprocket Shaft Bearing Housing and remove the housing.
21. Move the Sprocket Shaft towards the non-operator side until the shaft clears the operator side, then remove the Sprocket Shaft Assembly from between the machine side frames.

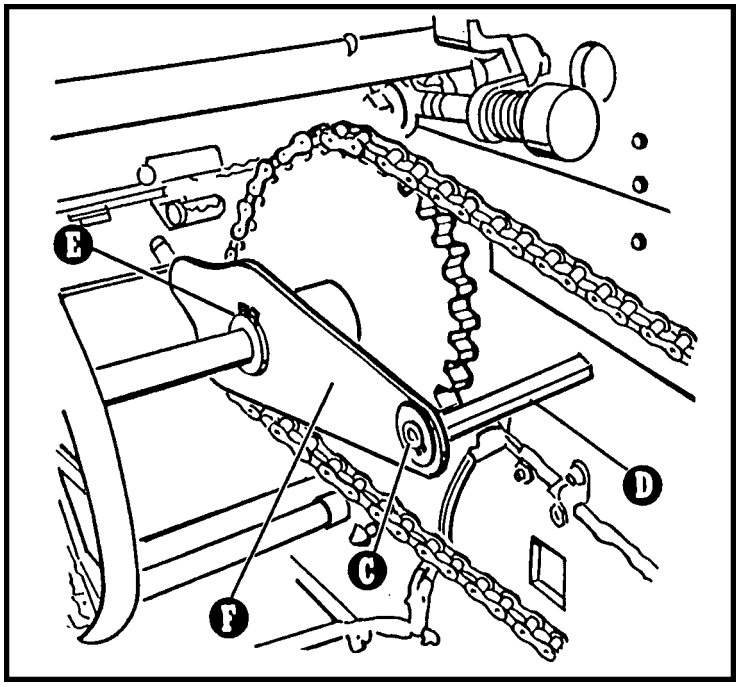


FIGURE 4-18

Installation

Install the Chain Delivery in the reverse order of removal. Note the following during installation:

1. The machine must be correctly timed during the assembly procedure.
2. The taper pin on the non-operator side Sprocket Gear must be seated securely.
3. The Back Stop Assembly has cutouts (J) which must go over the machine Tie Bar. (Figure 4-19)

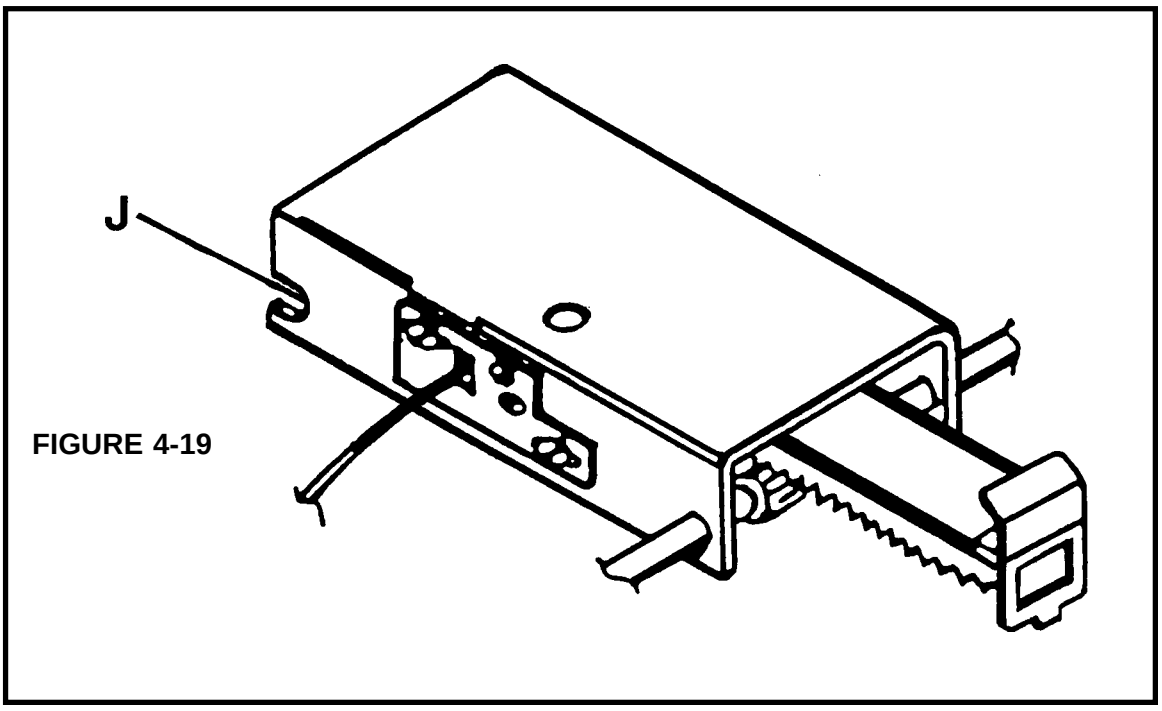


FIGURE 4-19

SECTION 5

ADJUSTMENTS

INTRODUCTION TO ADJUSTMENTS

WARNING:

THE MACHINE MUST BE UNPLUGGED FROM ITS RECEPTACLE WHEN MAKING ADJUSTMENTS. IF AN ADJUSTMENT REQUIRES THE MACHINE TO BE TURNED "ON," PLUG IT IN AND IMMEDIATELY UNPLUG IT WHEN THE ADJUSTMENT IS SATISFIED.

Operating adjustments are discussed in the 9970 Operating Instructions. The adjustments in this manual should only be made by a Customer Support Representative, not by the operator. To make the best use of this section of the manual, work as follows:

1. Read the requirements to find out what is expected of the adjustment.
2. Read the adjustment procedure.
3. If all requirements are met, go no further.
4. If all requirements are not met, make the adjustment.

NOTE:

Before making any adjustments, position the Buckle Control at "1", print (raise and lower) adjustments at "0", and both Gap Controls at "1".

NOTES

IMPRESSION CYLINDER SUPPORT ARM LEVER AND LATCH LEVER

The Impression Cylinder must lift and lock in the duplicating position under proper spring tension.

NOTE:

Set the Impression Cylinder Gap Control to the number 1 position.

Ensure that the flats on the Master Cylinder Gap Control Cams are parallel with the heads of the Separator Pins.

Remove the Blanket.

1. Loosen screw "C_2" on the Counter Operating Lever located on the operator side of the machine. (Figure 5-1)
2. Using screw "D", temporarily position the operator and non-operator side Impression Cylinder Support Arms so the distance from the underside of the Stop Block to the machined side of the Support Arms is 25/32" ±1/64" (19.4mm to 20.2mm). (Figure 5-2)

   Finger tighten the nuts at "D".
3. Adjust the Impression Cylinder Support Arm Springs to 1-31/64" (37.7mm).
4. Loosen screw "B" on the Impression Cylinder Lever (on the non-operator side of the machine).
5. Loosen adjusting screw "A" on the Impression Cylinder Lever.

NOTE:

The throw of the Eccentric Stud must be placed in the longest position from the center of the Actuating Lever. Do not make adjustments with the throw in the shortest position.

6. Remove the spring, Tru-arc ring, washer, and link arm from the Counter Operating Lever on the operator side of the machine.
7. Install the Cylinder Adjusting Tool (P/N 191551) on the Impression Cylinder Shaft and, using the locking knob, draw the Impression Cylinder to the operator side.

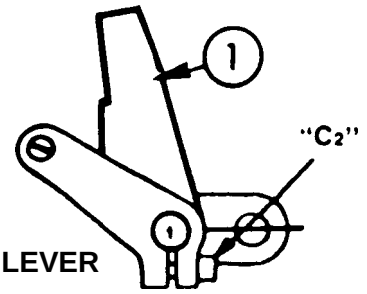
   Push the Cylinder Shaft to the non-operator side of the machine. Shoulder the Support Arm against the frame, shoulder the Impression Cylinder Lever against the Support Arm and position it so it will be latched by the Latch Lever.

   Loosen the locking knob on the Cylinder Adjusting Tool.

NOTE:

The truck of the Forwarding Roller Lifting Shaft must remain on the Impression Cylinder Cam.

FIGURE 5-1



1. COUNTER OPERATING LEVER

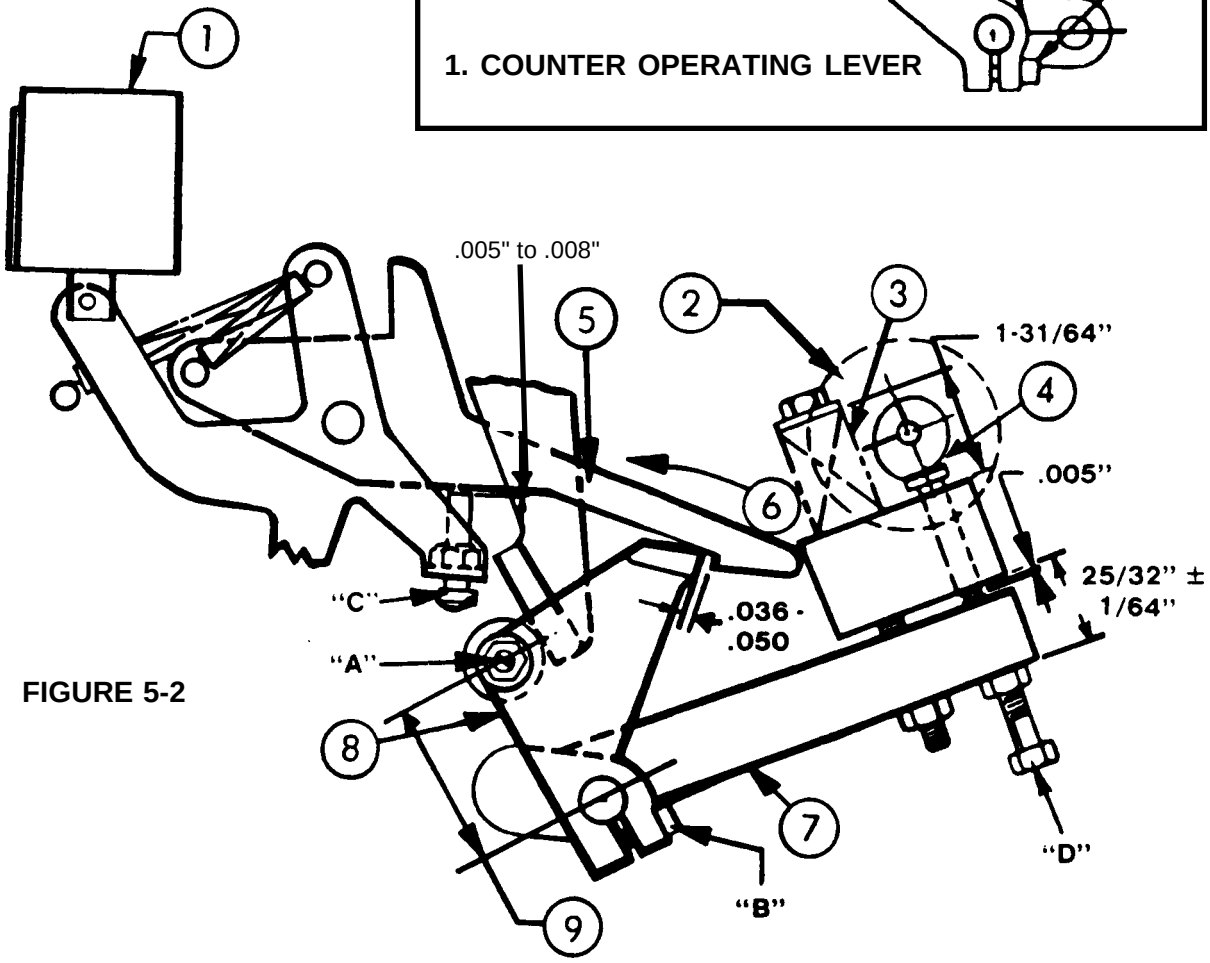


FIGURE 5-2

VIEW FROM NON-OPERATOR-SIDE

1. **IMPRESSION CYLINDER LATCHING SOLENOID**
2. **GAP CONTROL KNOB (OPERATOR-SIDE) - SET AT "1"**
3. **SUPPORT ARM SPRING**
4. **FLAT OF CAM**
5. **LATCH LEVER**
6. **MAXIMUM FORWARD POSITION**
7. **SUPPORT ARM**
8. **IMPRESSION CYLINDER LEVER**
9. **MAKE THE ADJUSTMENT WITH THE THROW OF THE ECCENTRIC IN THE LONGEST POSITION**

8. Insert a .0615" Curved Feeler Gauge (P/N 191544) into the crotch of the Impression and Blanket Cylinders (approximately 1/2") at both ends of the machined surface.

   Turn the Cylinder Adjusting Tool clockwise until both Impression Cylinder Support Arms just move. Tighten the locking knob on the tool to hold the Cylinder Shaft at this position.

   Tighten screw “B”.

9. With the Impression Cylinder Lever latched, adjust screws “D” on both sides to obtain a .005" clearance between the screw and the Separator Pin.

   Tighten the lock nuts and check the 1-31/64" (37.7mm) setting of the Support Arm Spring.

   Loosen the locking knob on the Cylinder Adjusting Tool (P/N 191551).

10. Unlatch the Impression Cylinder Lever and remove the Feeler Gauges from between the cylinders.

11. Turn the handwheel until the Impression Cylinder Lever is at its maximum forward position toward the feed-end of the machine.

12. Pull the Latching Lever down so that it engages the Impression Cylinder Lever and, while holding it in position, adjust screw “A” to obtain a 0.036" to 0.050" (0.9mm to 1.3mm) clearance between the Impression Cylinder Lever and the Latch Lever.

    Tighten the nut at “A”.

NOTE:

The throw of the Eccentric Stud must be placed in the longest position from the center of the Actuating Lever. Do not make adjustments with the throw in the shortest position.

13. Seat the Impression Cylinder Latching Solenoid Plunger by hand and adjust screw “C” for a gap of approximately .005"-.008" (.25mm) between the point of screw “C” and the Latch Lever when the Latch Lever is in its maximum “down” position.

NOTE:

The above are all preliminary adjustments and may need refining after taking a bead line between a known good inked Blanket and the Impression Cylinder. This check is made at the end of the Form Roller Adjustment when the machine is inked.

MASTER CYLINDER SUPPORT ARMS AND MASTER CYLINDER LEVER

The Master Cylinder must lower into contact with the Blanket and lock in position under proper spring pressure.

NOTE:

Set the Impression Cylinder Gap Control to the number 1 position, and ensure that the flats on the Master Cylinder Gap Control Cams are parallel to the heads of the Separator Pins.

1. Using screw "D_2", position the operator and non-operator side Master Cylinder Support Arms for a distance of 3/4" (19mm) from the underside of the Stop Block to the machined side of the Support Arms. (Figure 5-3)

   Finger tighten the nuts at "D_2".
2. Adjust the Master Cylinder Support Arm Springs to 1-39/64" (26.0mm) using the Master Cylinder Support Arm Gauge (P/N 191549).
3. Loosen the set screws in the Master Cylinder Shaft Collar (located on the non-operator side) and screw "B_2" on the Master Cylinder Lever (located on the operator side). (Figure 5-4)

   Install the Cylinder Adjusting Tool (P/N 191551) into the threaded end of the Master Cylinder Shaft. Using the locking knob, draw the shaft toward the operator side of the machine and the shoulder against the Master Cylinder Lever.

   Push on the tool to position the cylinder to the non-operator side Shoulder Support Arm Link and the collar on the non-operator side against the side frame.

   Tighten the set screws in the collar.
4. Loosen the locking knob on the Cylinder Adjusting Tool (P/N 191551) enough to free the Master Cylinder Lever.
5. Turn the handwheel until the solid areas of the Master and Blanket Cylinders are together.
6. Insert a .0615" Curved Feeler Gauge into the crotch of the Master and Blanket Cylinders at approximately 1/2" from both ends of the machined surface.

FIGURE 5-3

1. GAP CONTROL KNOB (OPERATOR-SIDE) - SET AT "1"
2. SUPPORT ARM SPRING
3. FLAT OF CAM
4. CYLINDER SUPPORT ARM

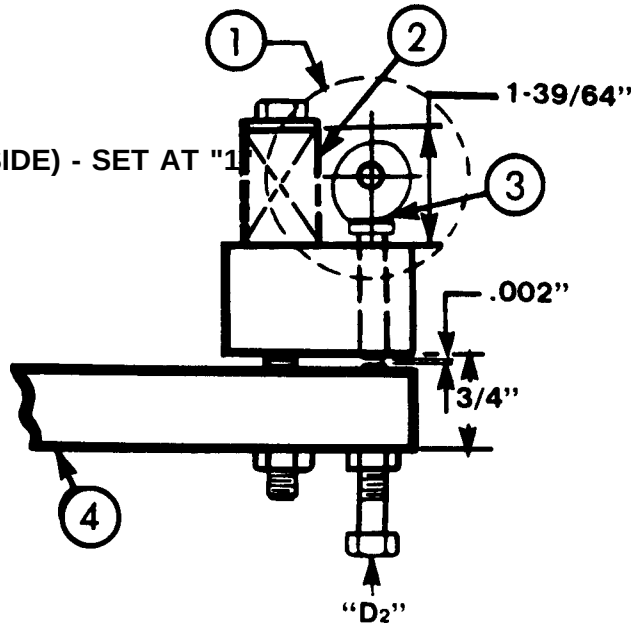
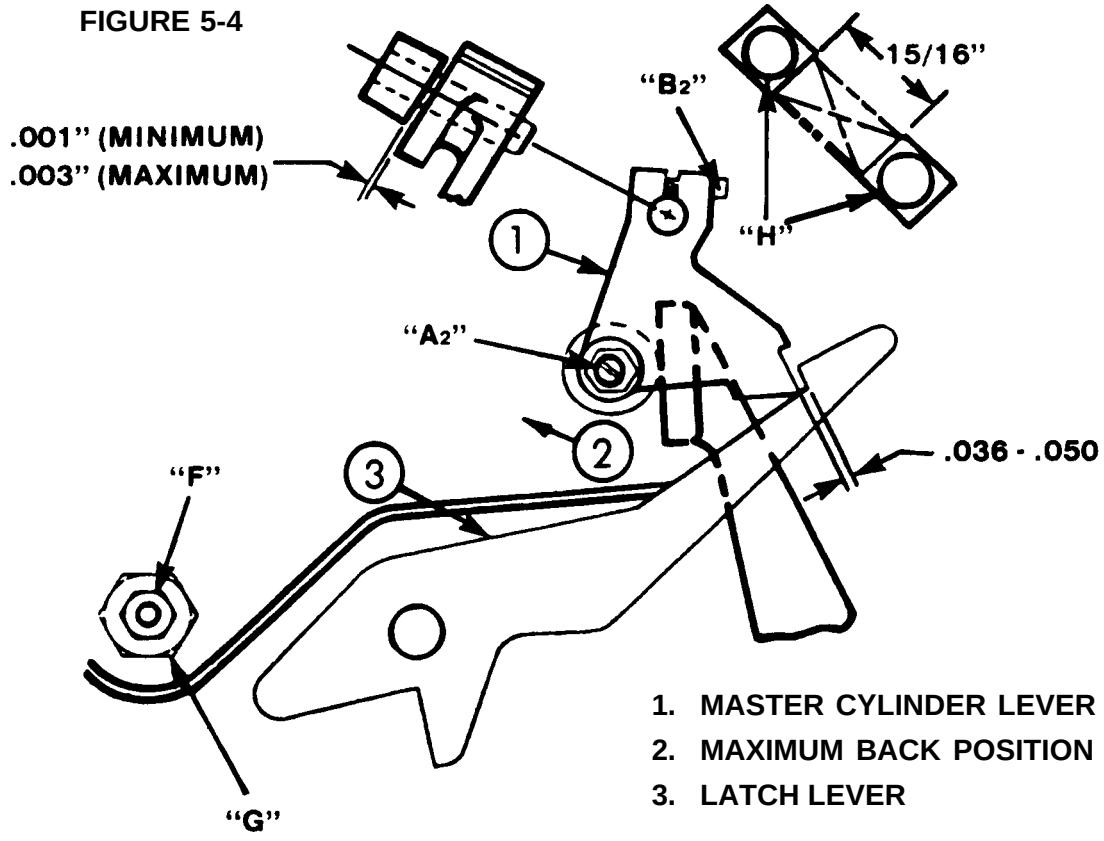


FIGURE 5-4



1. MASTER CYLINDER LEVER
2. MAXIMUM BACK POSITION
3. LATCH LEVER

7. Turn the Cylinder Adjusting Tool (P/N 191551) clockwise until both Support Arms just move. Keeping the Support Arms separated, position the Master Cylinder Lever so the Latch Lever will latch it.

   Tighten screw "B_2"

NOTE:

The Master Cylinder Lever maintains the location of the Master Cylinder at the Operator side frame. The Master Cylinder end-play must not exceed .003" (.076mm). The Lever must not bind at either extreme of travel. Unlatch the Lever, remove the Gauges and check.

8. With the .0615" Curved Feeler Gauge in place and the Master Cylinder latched, adjust both Support Arm Springs for 1-39/64" (26.0mm). (Figure 5-3)
9. Adjust screws "D_2" (both sides) for .002" (.051mm) between Screws "D_2" and the Separator Pins, with the heads of the pins in contact with the flats on the cam. Do not exceed the .002" tolerance. (Figure 5-3)
10. Unlatch the cylinder.
11. With the .0615" Curved Feeler Gauges in place, turn the Cylinder Adjusting Tool (P/N 191551) clockwise until the Master Cylinder comes into light contact with the Curved Feeler Gauges.
12. Loosen nut "F" and adjust eccentric "G" for equal contact on both Curved Feeler Gauges. (Figure 5-4)

    Tighten nut "F".

NOTE:

After each adjustment on Eccentric "G", relatch the Cylinder and check the .002" (.051mm) tolerance between the Stop Blocks and Screws "D_2". Adjust Screws "D_2" as necessary.

The indicator mark on Eccentric "G" must be between the twelve o'clock (12:00) and four o'clock (4:00) positions. (Figure 5-4)

13. With the Master Cylinder Lever latched and the heads of the Separator Pins in contact with the flats on the Gap Control Cams, adjust screws "D_2" on both sides to obtain a .002" (.051mm) clearance between the screws and Stop Blocks. (Figure 5-3)

    Tighten the lock nuts and check the 1-39/64" (26.0mm) setting of the Support Arm Springs. Readjust if necessary.
14. Loosen the lock nuts and adjust eccentric screws "H" to obtain a 15/16" (24mm) space between the blocks. (Figure 5-4)
15. Unlatch the Master Cylinder Lever and remove both Feeler Gauges from between the cylinders.
16. Turn the handwheel until the Master Cylinder Lever is at its maximum "back" position. Adjust screw "A_2" to obtain a 0.036" to 0.050" (0.9mm to 1.3mm) clearance between the Master Cylinder Lever and Latch Lever.

    Tighten the nut at "A_2".

NOTE:

The above are all preliminary adjustments and may need refining after taking a bead line between the Master Cylinder and a known good Blanket. This check is made at the end of the Form Roller adjustment when the machine is inked.

MASTER CYLINDER LATCH LEVER

1. With the Impression Cylinder Lever latched, draw the Impression Cylinder against the operator side frame by tightening the knob on the Cylinder Adjusting Tool (P/N 191551).
2. Loosen the knob on the tool and position the Counter Operating Lever to obtain a 2-3/4" (70mm) dimension from the edge of the Roll Pin to the corner of the Counter Operating Lever. (Figure 5-5)

   Hold the Counter Operating Lever against the Support Arm and tighten the screw C2.

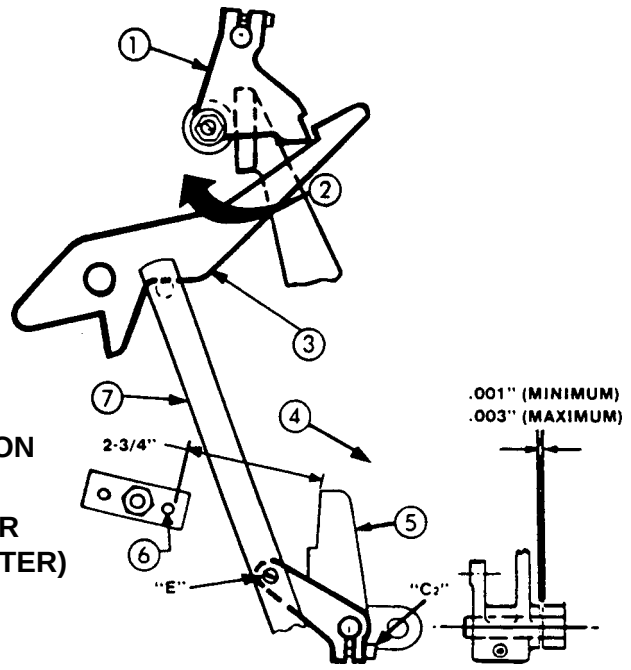
NOTE:

The Counter Operating Lever maintains the location of the Impression Cylinder at the operator side frame. .001" to .003" (.025mm to .076mm) End-Play is permissible. It must not bind at either extreme of travel.

3. Remove the Cylinder Adjusting Tool (P/N 191551) and replace the Master Cylinder Latch Link, washer, Tru-Arc ring, and spring.
4. Turn the handwheel until the Counter Operating Lever is at its extreme forward position.

   Adjust eccentric screw “E” so the Master Cylinder Latch Lever can fully engage with the Master Cylinder Lever. Tighten the locknut on screw “E”.

FIGURE 5-5



1. **MASTER CYLINDER LEVER**
2. **MAXIMUM BACK POSITION (TOWARD RECEIVING-END)**
3. **LATCH LEVER**
4. **MAXIMUM FORWARD POSITION (TOWARD FEED-END)**
5. **COUNTER OPERATING LEVER (DOES NOT OPERATE COUNTER)**
6. **ROLL PIN**
7. **LATCH LINK**

MACHINE TIMING

All timing marks must align before the machine is operated.

1. Face the open areas of all the cylinders towards the receiving end of the machine.
2. Position the Raise-Lower at “0”.
3. Align the timing marks.

   The marks on all the gears come into time every five revolutions of the cylinders. The cylinders come into time every revolution. (Figure 5-6)

NOTE:

On Receiving Tray models, all timing marks of all gears come into time every seven revolutions of the Cylinders. Cylinders come into time every revolution. (Figure 5-6A)

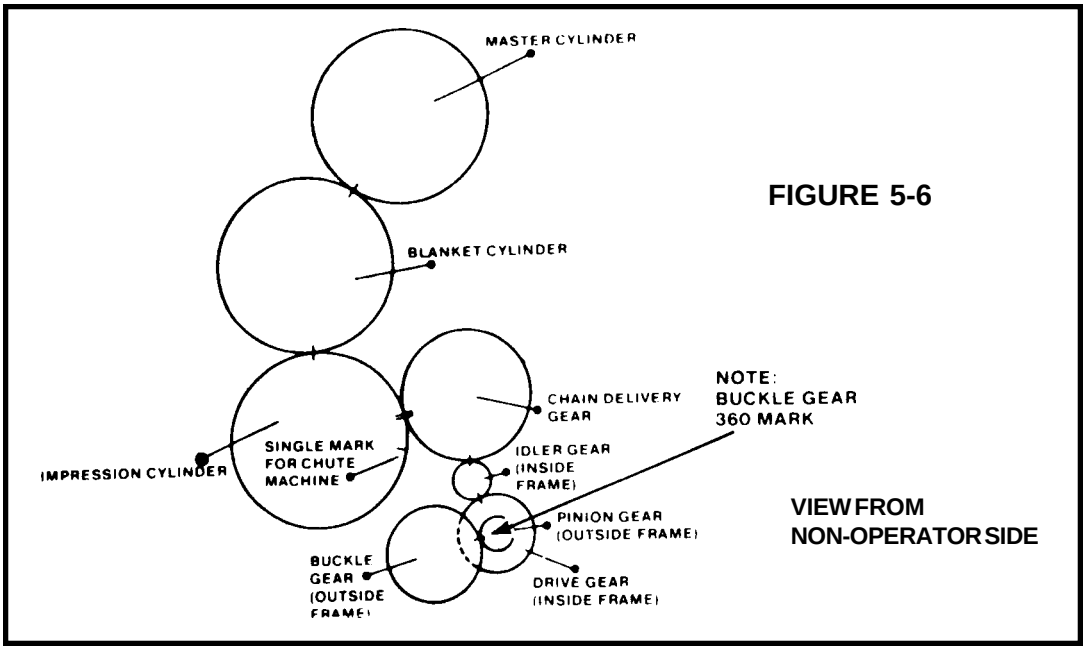


FIGURE 5-6

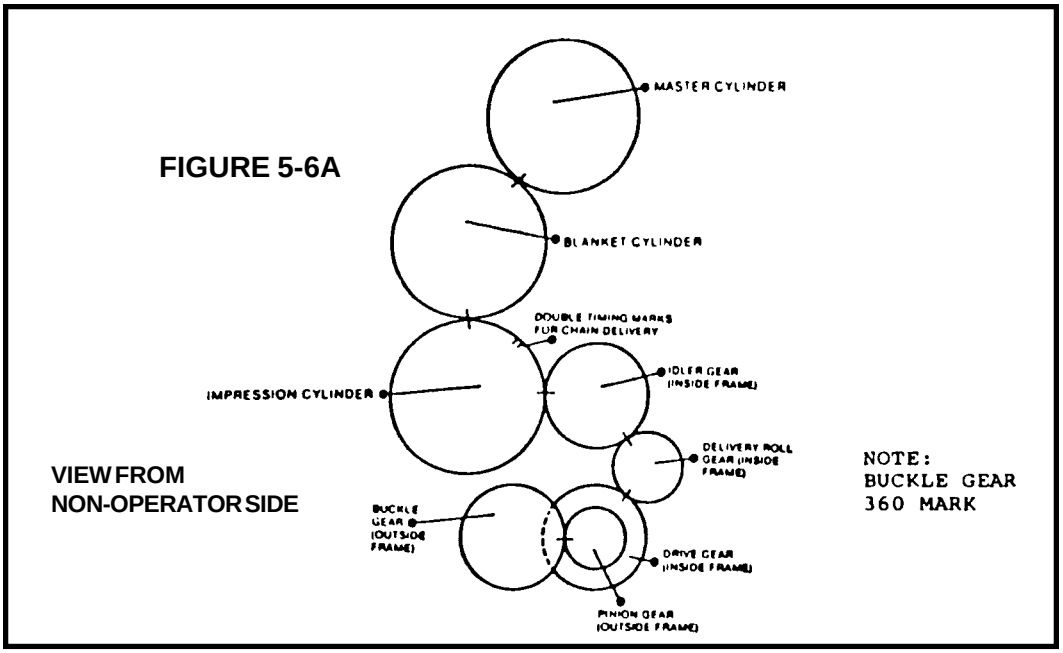


FIGURE 5-6A

FINAL MASTER AND IMPRESSION CYLINDER SUPPORT ARMS

The Cylinder Support Arms must be fine-tuned for even pressure and even gapping.

1. Install a clean metal master.
2. Turn “ON” the machine.
3. Move the Operation Control Lever to the INK position and ink the entire master.
4. Move the Operation Control Lever to the NEUTRAL position.
5. Turn “OFF” the machine.
6. Gently turn the Master Cylinder Lever clockwise to make light contact with the blanket.

   Once contact is made, release the Master Cylinder Lever and turn the handwheel until the bead line is visible. The width of the bead line must be equal across its entire length.
7. If the width of the bead line is not equal across it’s entire length, loosen the locknut of screw “D_2” on the thinner side and adjust the screw until the bead line is even. (Refer back to Figure 5-3.)
8. After setting the Master Cylinder, ink up the entire blanket on the Blanket Cylinder.
9. Insert a sheet of paper 13" x 17-3/4" over the Forwarding Rollers into the grippers.
10. Turn the handwheel until the paper is between the Blanket and Impression Cylinders.
11. Turn the Impression Cylinder Lever on the non-operator side counterclockwise to bring the cylinders into light contact.

    Turn the handwheel and observe the ink bead line. It’s width must be equal across its entire length.
12. If the bead line is uneven, loosen the locknut on screw “D” on the thinner side and adjust the screw until the bead line is even. (Refer back to Figure 5-4.)

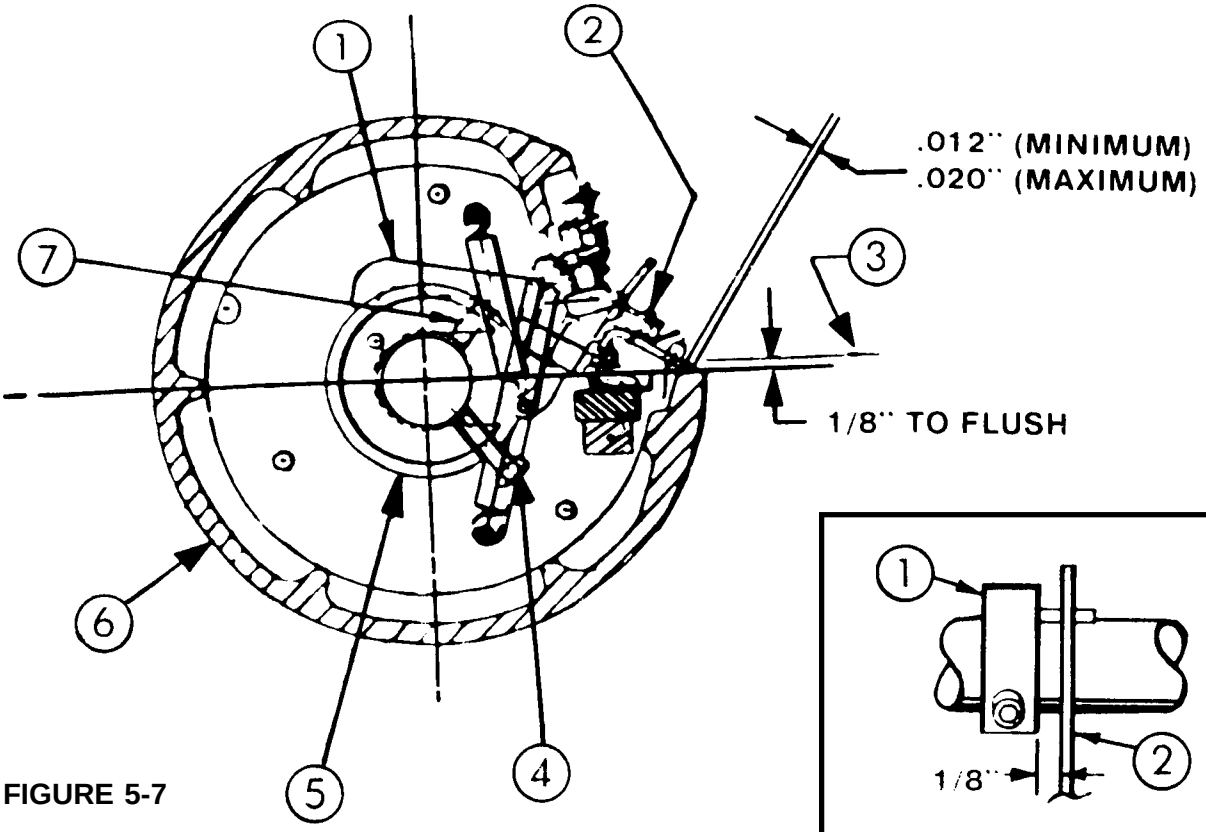


FIGURE 5-7

3. TOP SURFACE OF THE GUARD IN THE MASTER-LOADING POSITION
4. HEX HEAD SCREW
5. COLLAR
6. MASTER CYLINDER
7. ALLEN SET SCREW

FIGURE 5-8

1. CLAMP HOOK
2. LOCKING LEVER

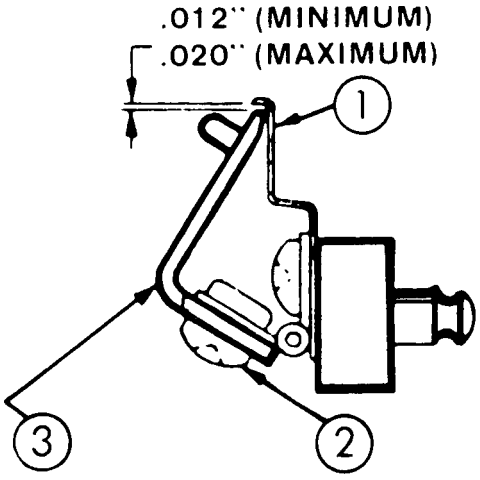


FIGURE 5-9

1. CLAMP PLATE
2. SCREWS
3. UNIVERSAL CLAMP ASSEMBLY

MASTER CYLINDER CLAMP

The Straight-Edge Clamp must have a .012" to .020" clearance (.30mm to .51mm clearance) between the Universal Clamp Assembly and the Clamp Plate with the clamp in the closed position. (Figures 5-7 and 5-8)

1. Loosen the screws that mount the Universal Clamp Assembly to the hinge. (Figure 5-9)
2. Adjust the Universal Clamp to attain the .012" to .020" (.30mm to .51mm) dimension. Tighten the screws. (Figure 5-9)

NOTE:

The .012" (minimum) to .020" (maximum) dimension (.30mm to .51mm) is to be set on both ends of the Clamp Assembly between the first two Pinbar Studs in the Universal Clamp. The two .012" to .020" settings must be within .003" (.076mm) of each other.

3. Set the Head Clamp Lateral and Angular Adjusting Knobs to midpoint on their adjustments.

CLAMP SUBASSEMBLY TO MASTER CYLINDER

1. Leave the operator and non-operator side Clamp Mounting Brackets loose.
2. Move the brackets so Surface “A” is level with Surface “B”, and Surface “C” contacts Surface “D” at Point “E” at both ends of the cylinder when the Universal Clamp is closed. (Figure 5-10)
3. Tighten the operator and non-operator side Mounting Bracket screws. Check that the adjustment did not change and that lateral and angular adjustments move freely.

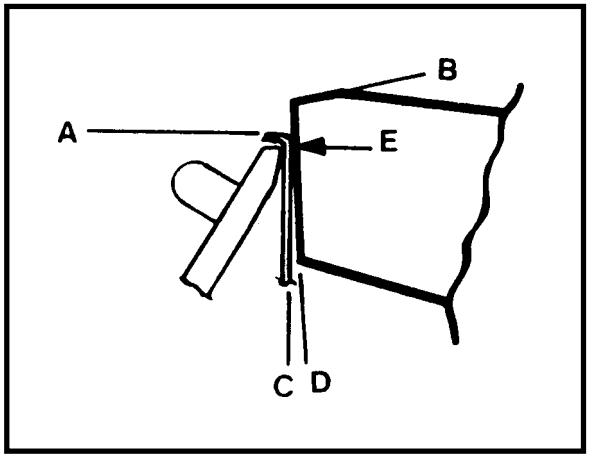


FIGURE 5-10

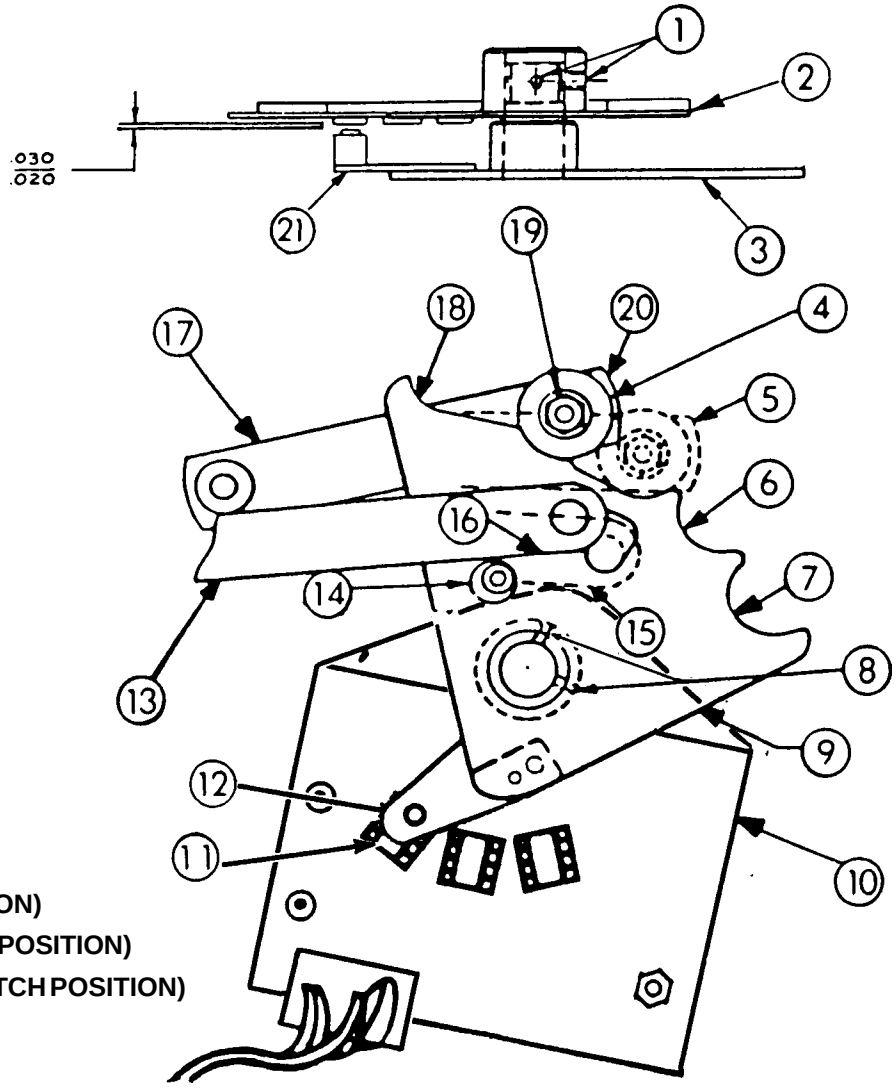


FIGURE 5-11

1. SET SCREWS
2. SENSOR PLATE ASSEMBLY
3. SEQUENCE CAM
4. ADJUSTABLE TRUCK
5. DETENT LEVER (INK POSITION)
6. SEQUENCE CAM (NEUTRAL POSITION)
7. SEQUENCE CAM (NIGHT LATCH POSITION)
8. SET SCREWS
9. SEQUENCE CAM
10. SENSOR PLATE AND PC BOARD ASSEMBLY (HALL EFFECT)
11. INK SENSOR
12. SENSOR MAGNET
13. CONTROL LINK
14. ECCENTRIC DISC
15. CONTROL LINK (INK POSITION)
16. CONTROL LINK (IMAGE POSITION)
17. DETENT LEVER
18. SEQUENCE CAM (FEED POSITION)
19. RETAINING NUT
20. DETENT LEVER (ALTERNATE CYCLE OR IMAGE POSITION)
21. ACTUATOR

SINGLE LEVER CONTROL DETENT, ECCENTRIC DISC, AND HALL EFFECT PC BOARD

The Detent Truck must properly locate in the Sequence Cam detents for correct Form Roller action. When the Operation Control Lever moves from INK to IMAGE the Control Link must lift into the overtravel slot.

1. Move the Operation Control Lever to the INK position.
2. Turn the Form Roller Levers to the “ON” position.
3. Loosen the retaining nut on the Detent Lever Adjustable Truck.
4. Move the Operation Control Lever until the Form Roller Separator Cams are free of, and the Cam Flats are parallel to, the Form Roller Blocks.
5. Holding the Operation Control Lever in the position stated above, adjust the Detent Lever Truck to fit properly in the INK position of the Sequence Cam. Tighten the nut. (Figure 5-11)
6. Move the Operation Control Lever to the NIGHT LATCH position and check the Form Rollers for proper release. Readjust slightly if necessary.
7. Move the Operation Control Lever to put the Detent Lever Adjustable Truck in the INK position. (Figure 5-11)
8. Loosen the socket head cap screw. Rotate the eccentric disc to bring it in contact with the lower edge of the Control Link. Tighten the cap screw.
9. Move the Operation Control Lever to the IMAGE position and then back to the INK position.

   The eccentric disc should smoothly raise the Control Link in and out of the slot in the cam. Readjust the eccentric disc if necessary for smooth operation.
10. Move the Operation Control Lever to put the Detent Lever Truck in the IMAGE position.

    Loosen the set screws in the Sensor Plate Assembly and rotate the PC Board until the Sensor Magnet lines up with the INK Sensor. Gap at .020" to .030” and tighten the set screws.
11. Move the Operation Control Lever to the NEUTRAL and NIGHT LATCH positions.

    The edges of the Sensor Magnet should over lap or line up with the edges of the other Sensor Chips, and the Sensor Magnet should not come in contact with the Sensors. Readjust the Sensor Plate Assembly if necessary.

FRONT PAPER GUIDES

The Front Paper Guides must be aligned for good register and proper alignment of the paper pile.

1. Remove the chains (1) on both sides. (Figure 5-12)
2. Turn the sprockets (2) on both sides until the Paper Guides (3) are at a 90° angle with the Paper Supports (4). The dimension between the Paper Guides (3) at the top may be no more than, but may be 1/16" less than, the dimension between the guides at the bottom.
3. Replace the chains (1) on both sides.
4. Loosen the two screws (5) on both sides in the Sprocket Bracket (6). Adjust the brackets (6) for a 3/4" stack at the center of the chains.

   Tighten the screws (5) on both sides.

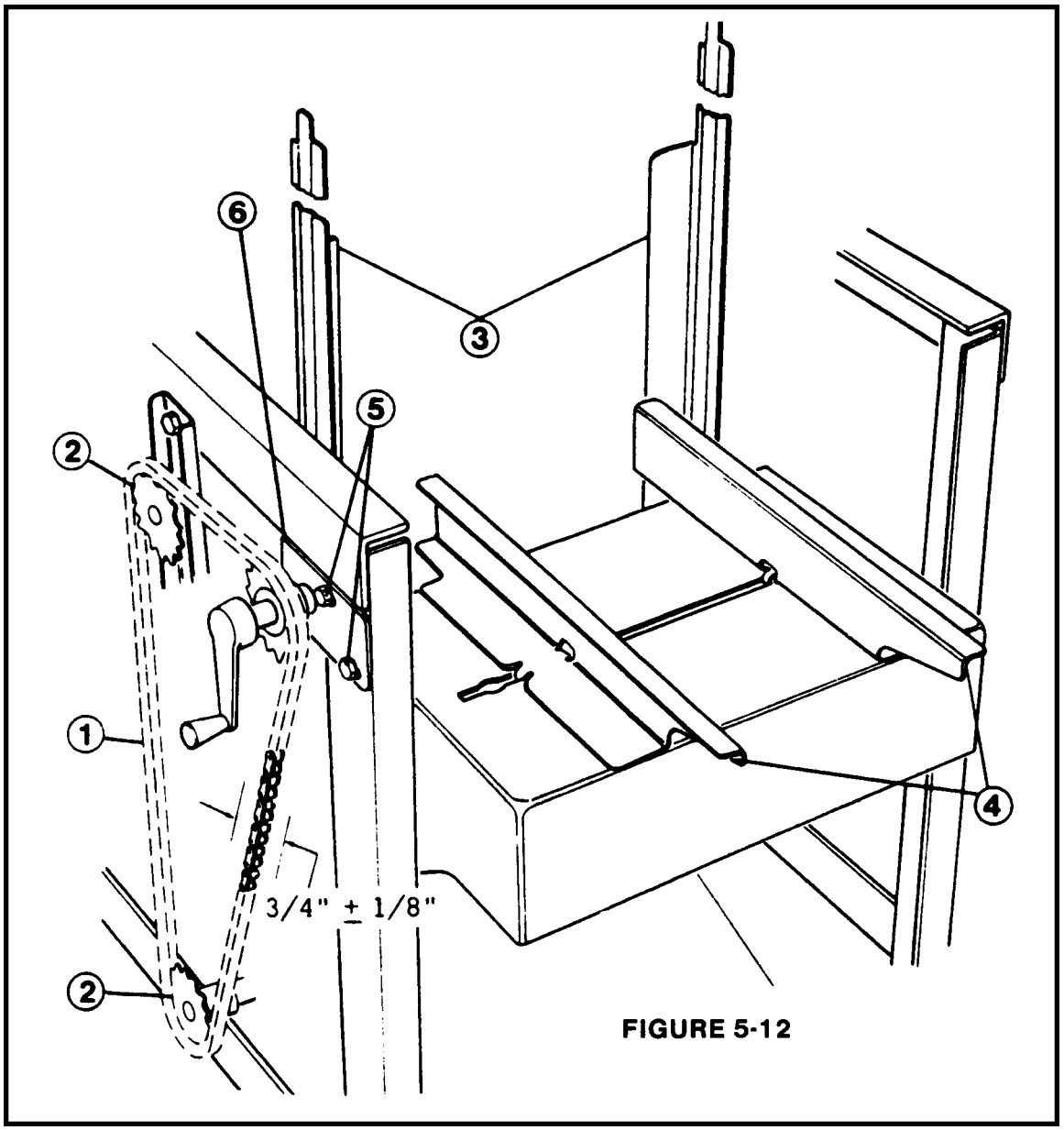


FIGURE 5-12

PAPER BUCKLE

For good register and to prevent misfeeding, the Paper Buckle Gear must properly forward paper to the Impression Cylinder Grippers.

1. Set Buckle Control at “0”.
2. Check that the “360” Timing Mark on the Buckle Gear (1) and the dot on the Pinion Gear (2) are aligned. (See Figure 5-13.)
3. Loosen the locking screws (3).
4. Preset the screws (4 and 5) for a 3/16" clearance between the cam plate (6) and boss (7) of the gear (1).
5. Check that the Main Control Switch, located in the rear of the Control Box, is in the “ON” position.
6. Momentarily depress the “FEED” and “PUMP” switches on the Control Panel. This automatically energizes the Pump Motor and Feed Control Solenoid.
7. Manually feed a sheet of paper into the grippers until the grippers are fully closed and lever (8) just contacts (but does not lift) the adjustment screw (9) on lever (10). The Upper Forwarding Roller (11) must remain in contact with the sheet of paper. (See Figure 5-14.)
8. Mark the trail-edge of the sheet being fed into the grippers on the sheet below it on the Feed Table.
9. Lift the Upper Forwarding Roller (11), then stretch out and release the sheet. Do not pull the sheet out of the grippers.
10. Mark the trail-edge of the sheet again. The distance between the two marks should be 3/16".

    To increase the buckle, adjust the screws (4 and 5) to increase the 3/16" dimension between the cam plate (6) and boss (7) of gear (1). Do the opposite to decrease the buckle.
11. Tighten the screws (3).

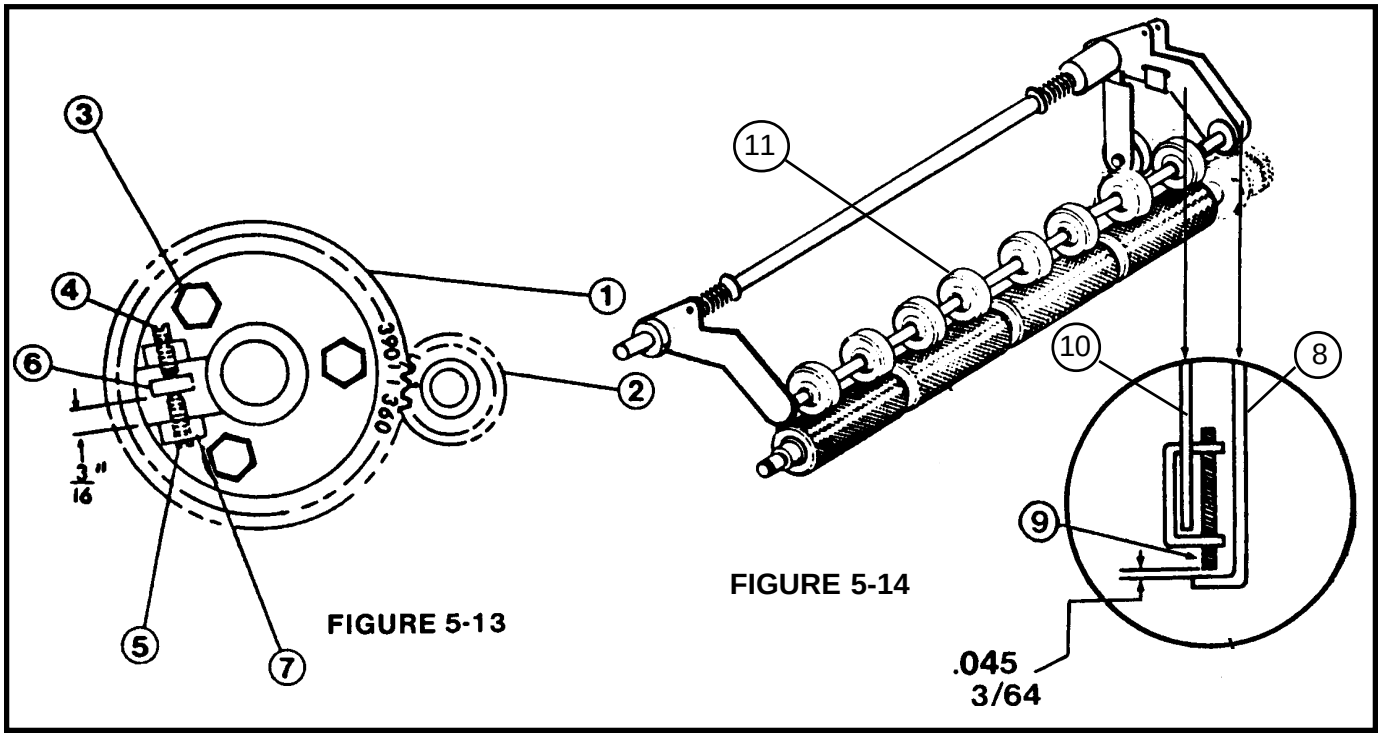


FIGURE 5-13

FIGURE 5-14

IMPRESSION CYLINDER PAPER GRIPPERS

The Impression Cylinder Grippers must be properly adjusted for accurate register. There must be no binding, backlash, or malformation of parts on the Gripper Assembly.

1. Remove one Chain Delivery Gripper Bar Assembly.
2. Set the Impression Cylinder Gap Control at “1”.
3. Check for worn or malformed Gripper Fingers, Stop Assembly parts, and Ejector Fingers.
4. Check for a .010" to .013" clearance between the Paper Stops and the Cylinder Anvil in the closed position. (Figure 5-15)
5. Seat the Impression Cylinder Latching Solenoid Plunger manually and turn the handwheel until the Impression Cylinder latches.
6. Turn the handwheel until the grippers are open to receive paper.
7. Manually insert a sheet of 20 lb. paper over the Upper Forwarding Roller to the stops between the grippers and the Cylinder Anvil.
8. Turn the handwheel until the grippers are in the normally closed position, making sure the paper is up against the Paper Stop.
9. Turn adjustment screw “A” counterclockwise until very light contact is made with the grippers on the sheet.
10. Turn the adjustment screw “A” 1-1/2 turns counterclockwise.
11. Insert a 4" wide sheet of 20 lb. paper under each gripper segment and check for 2-1/2 lb. to 4 lb. pull underneath each of the segments.
12. Adjust the 3/32" Allen screw “A” as necessary to obtain the correct pull.
13. If you are unable to obtain a 2-1/2 lb. to 4 lb. pull on both sides, repeat Step’s 8 through 11.

NOTE:

Excessive tension will cause premature wear and overloading when feeding card stock.

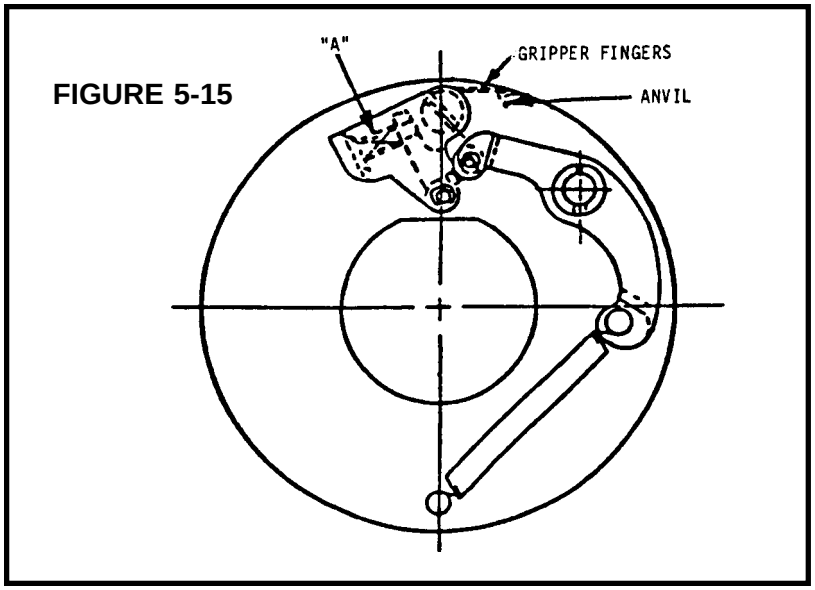


FIGURE 5-15

TABLE RAISING LATCH

To maintain the proper paper feeding level, the Table Raising Latch Lever must engage and disengage the Table Raising Pawl.

1. Locate the Power Lever (1) outside of the operator side frame behind the Table Raise Gear (2). (Figure 5-16)
2. Turn the handwheel until the Power Lever (1) is set at its maximum forward position.
3. Loosen the screws (3) and adjust the Regulator Plate (4) so the Latch Lever (5) clears the Pawl Lever (1) by 1/16". Use the .0606" Flat Feeler Gauge (6) held flat against the anvil (7).
4. Tighten the screws (3).

NOTE:

Paper Height Control Lever must be in the extreme "up" position.

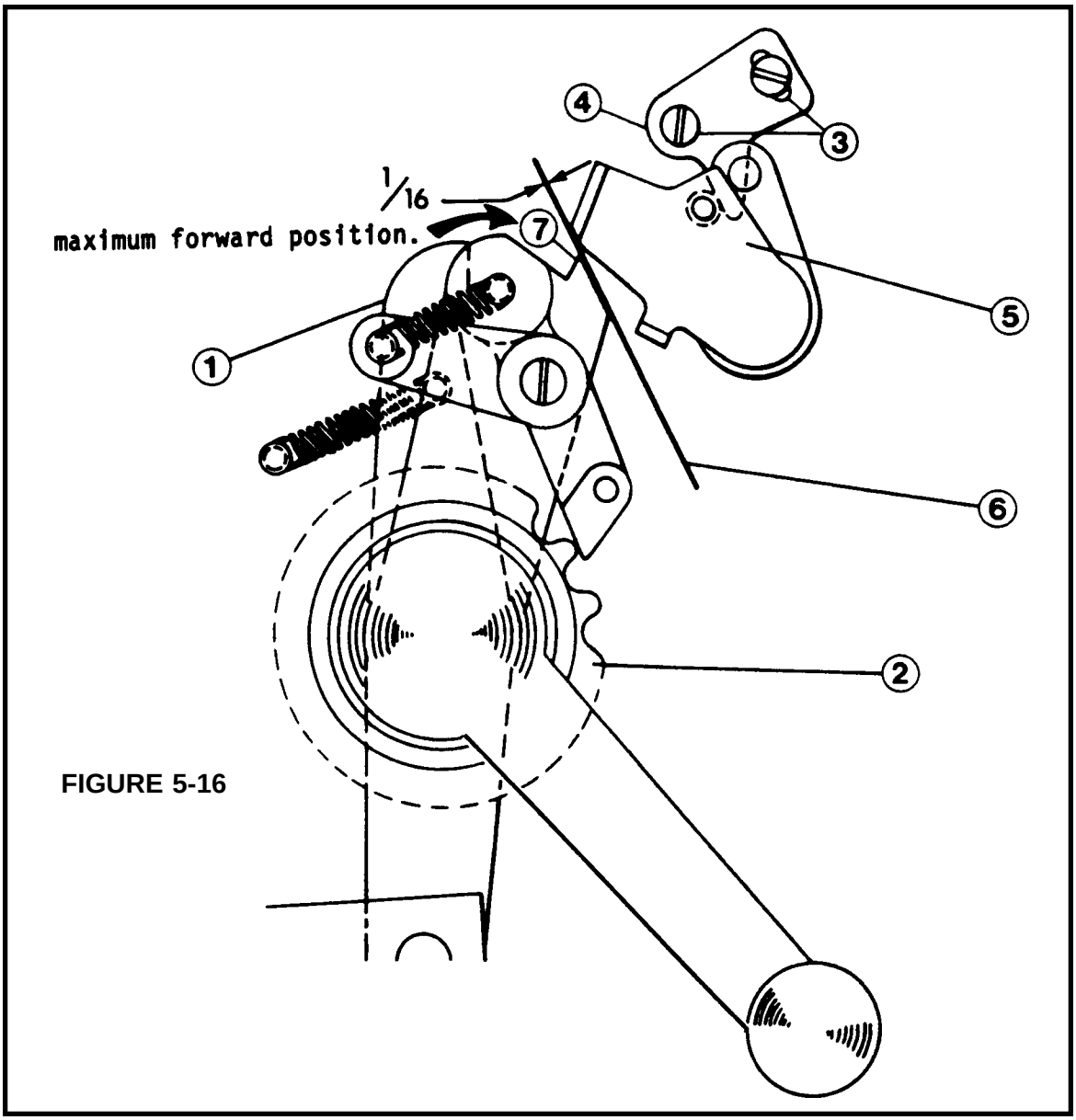


FIGURE 5-16

Microlateral Side Guide

Micro Guide Plate must be properly adjusted for accurate registration.

NOTE:

Make sure that the Nylon Screw (1) is partially loose when turning the Adjusting Screw. Do NOT overtighten any screws as it may bow the Guide Plate. (Figure 5-17)

1. Move the Microlateral Side Guide Assembly next to the Non-Operators Side of the machine and lock it in place by securing knobs (2), (3), (4), and (5).
2. Using gauge, square the face of the left hand guide plate with the front apron in both vertical and lateral planes by means of three left hand side adjustment screws (6). Tighten screw (1) only enough to prevent movement of the Side Guide and check squareness.

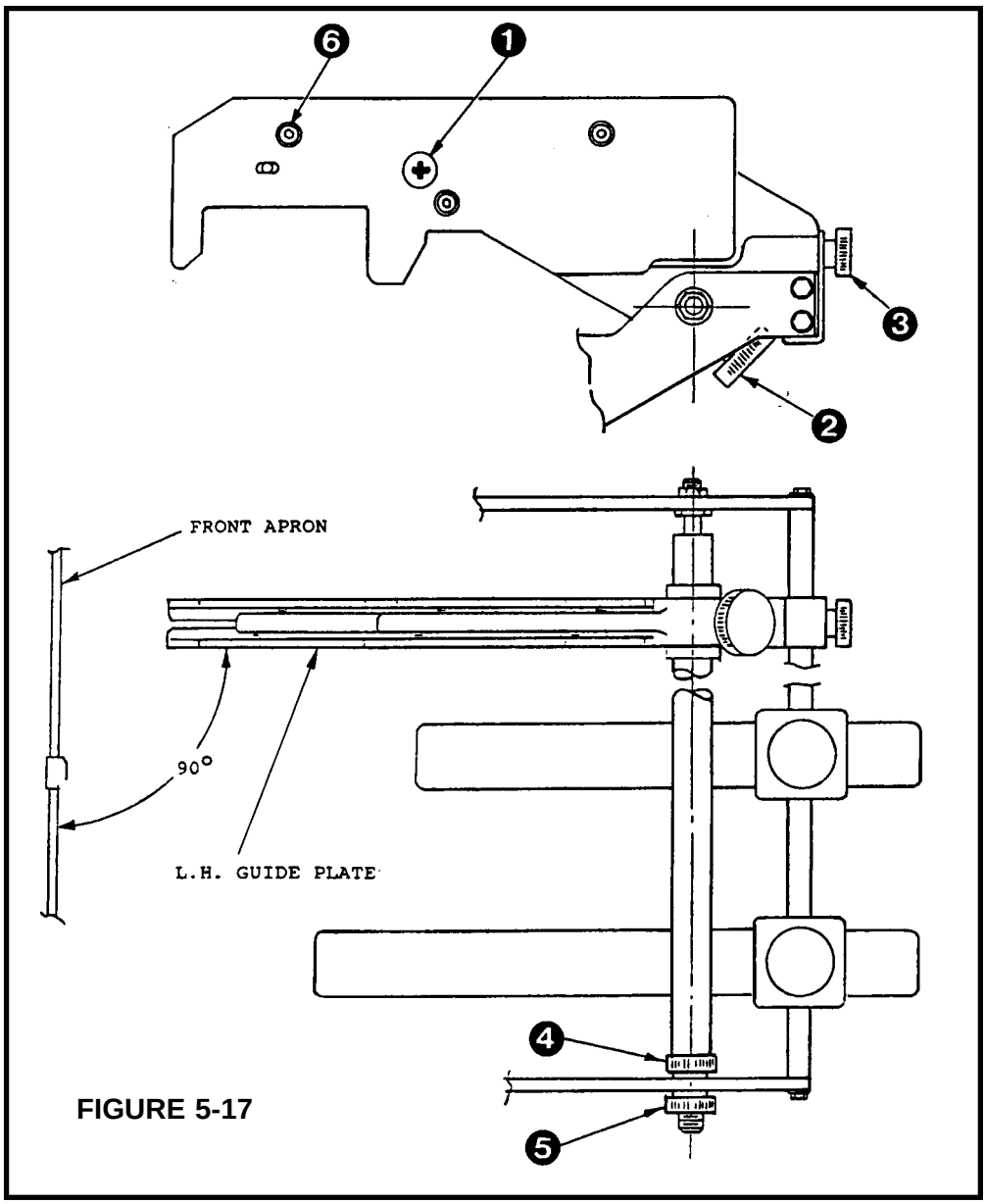


FIGURE 5-17

Paper Feed Guides

For proper stacking and registration, the Front Guides and Feed Table Hardware must be properly positioned.

1. Set the Non-Operator Side Front Guide (1) at the 8-1/2" graduation on Front Apron (2). (Figure 5-18)
2. Put a 1/4" thick, 8-1/4 x 10-3/4 board on the Feed Table Supports (not shown) and load 8-1/2 x 11" 20 lb. paper.
3. Locate the paper against the Front Apron (2) and the Non-Operator Side Front Guide; set the Operator Side Front Guide approximately 1/32" from the paper.
4. Position the Microlateral Guide (3) in contact with paper.
5. Position the Operator Side Rear Guide (4) two inches fro the back edge of the paper and compress spring approximately 1/8".
6. Bring the Back Stop (5) snug against the paper, do not bind. The Paper Weight (6) must rest on the paper.

⚠ CAUTION:

Never position the bottom edge of the Guide Plate beyond the Paper Guide as the paper will bind under the Guide Plate and jam the Paper Table.

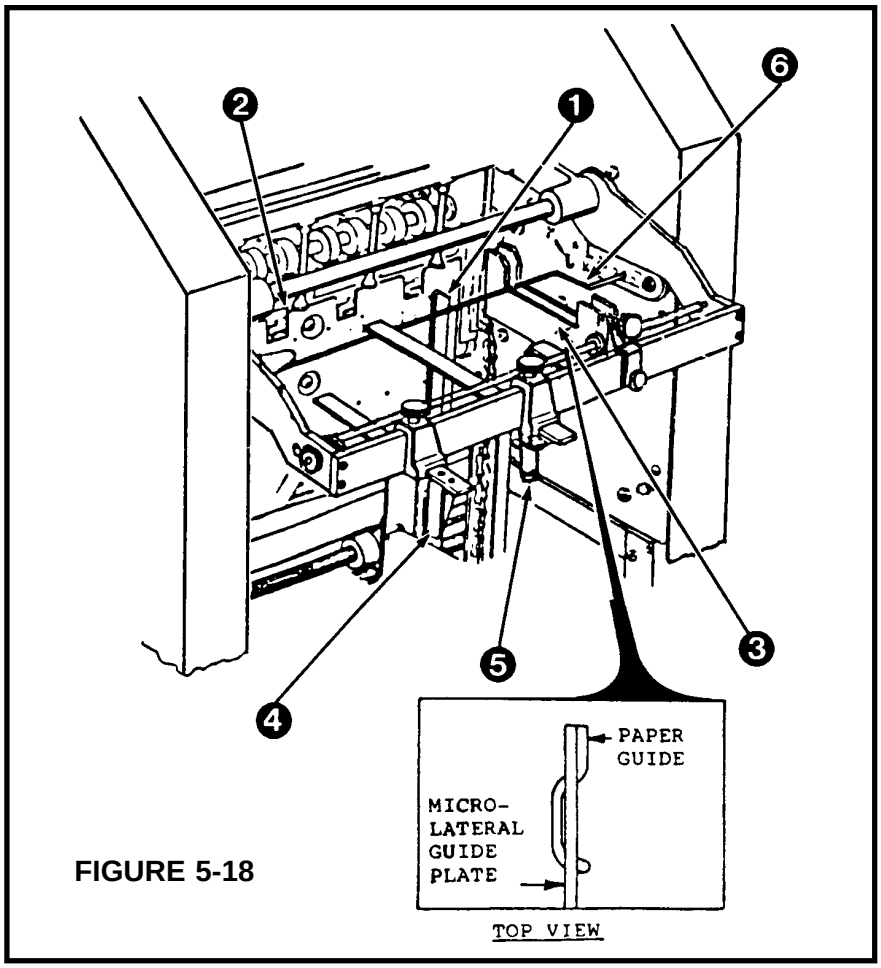


FIGURE 5-18

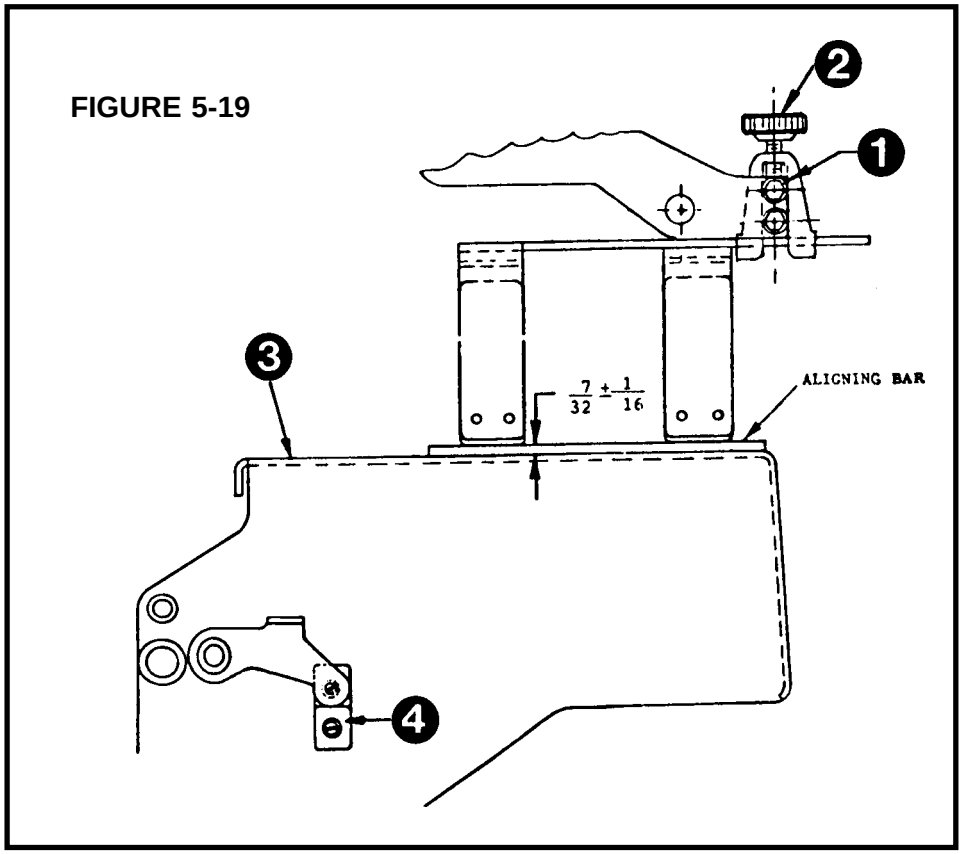
FEED TABLE REGULATION

The Spring Guides must be parallel with the Front Mounting Bar.

The Feed Table must stop elevating when the surface of the Feed Table is 7/32" (± 1/16") from the bottom edge of the operator side guide. (Figure 5-19)

1. Loosen four screws (1) securing the Front Mounting Bar.
2. Place alignment bar on the Feed Table on the Operator Side of the machine.
3. Tighten the Side Guide Knob (2).
4. Raise the Feed Table (3) by hand until the alignment bar comes in contact with the Side Guides. At this point the Side Guide should be parallel to the Front Mounting Bar.
5. Tighten the four screws (1), that was loosen in Step 1.
6. Lower the Feed Table (3).
7. Adjust the Trip Bracket (4) on the Operator Side of the Feed Table (3) so that when the Feed Table is raised by means of turning the handwheel, it will automatically stop elevating when the Feed Table is 7/32" ± 1/16" below the Paper Guides.
8. Adjust the bracket up if the table elevates too high, or adjust the bracket down if the table does not elevate high enough.
9. Under power, check that 7/32" ± 1/16" clearance dimension is maintained.

FIGURE 5-19

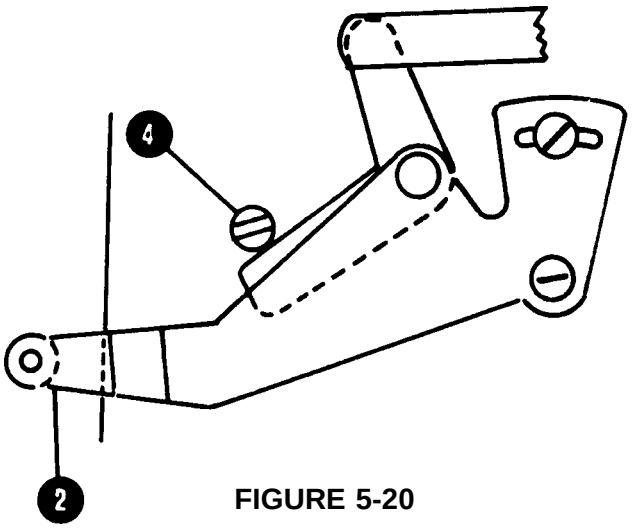


PAPER HEIGHT REGULATION

The Paper Height Regulators must raise and lower to their proper levels.

1. Turn the handwheel until the Paper Height Regulators (1) are at their lowest position. (Figure 5-20)
2. Move the Paper Height Control Lever (2) so the regulators (1) are 3/8" from the bottom of the slot in the apron (3).
3. Turn the handwheel until the Paper Height Regulators (1) are at their high position.
4. Adjust the eccentric stud (4) so the regulators (1) are 13/16" from the bottom of the slot in the apron (3).

   Tighten the eccentric stud (4).



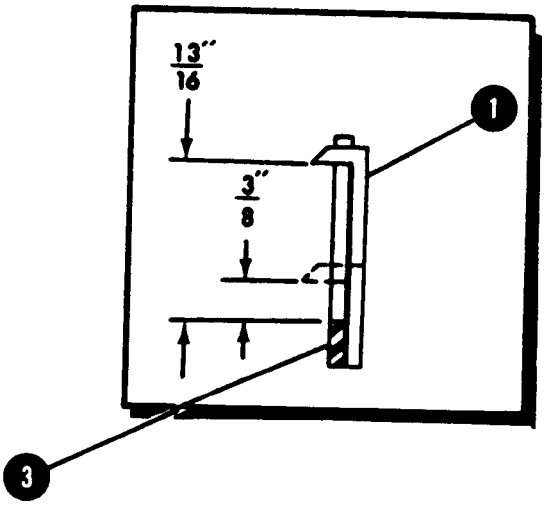


FIGURE 5-20

SUCTION FEET AND BLOWER TUBES

To assure proper feeding and accurate register, the impression paper must be maintained at the proper feeding height.

1. Set the Buckle Control to “0”.
2. The six Blower Hoses (1) are behind the front apron. Position the Blower Hoses (1) 3/8" from the end of the shoulder on each Blower Tube (2). (Figure 5-21)
3. Press the "FEED" key on the control panel.
4. Turn the handwheel until the Suction Tubes (3) are in their maximum down position. Remove one rubber suction cup.
5. Loosen the screws (4) in the Feed Forwarding Link (5).
6. Use the Sucker Foot Adjusting Gauge (P/N 191541) as shown in “A”. Adjust the plate (6) so the front edge of the Suction Tubes (3) are 15/16" from the apron (7).
7. Tighten the screws (4).
8. Loosen the screws (8) in the Feed Raise Link (9).
9. Use the gauge (P/N 191541) as shown in “B” with the bottom of the tool at the bottom of the slot. Holding it level, adjust the plate (10) so the bottom of the Suction Tubes (3) are 11/16" from the bottom of the slot in the front apron.
10. Tighten the screws (8).

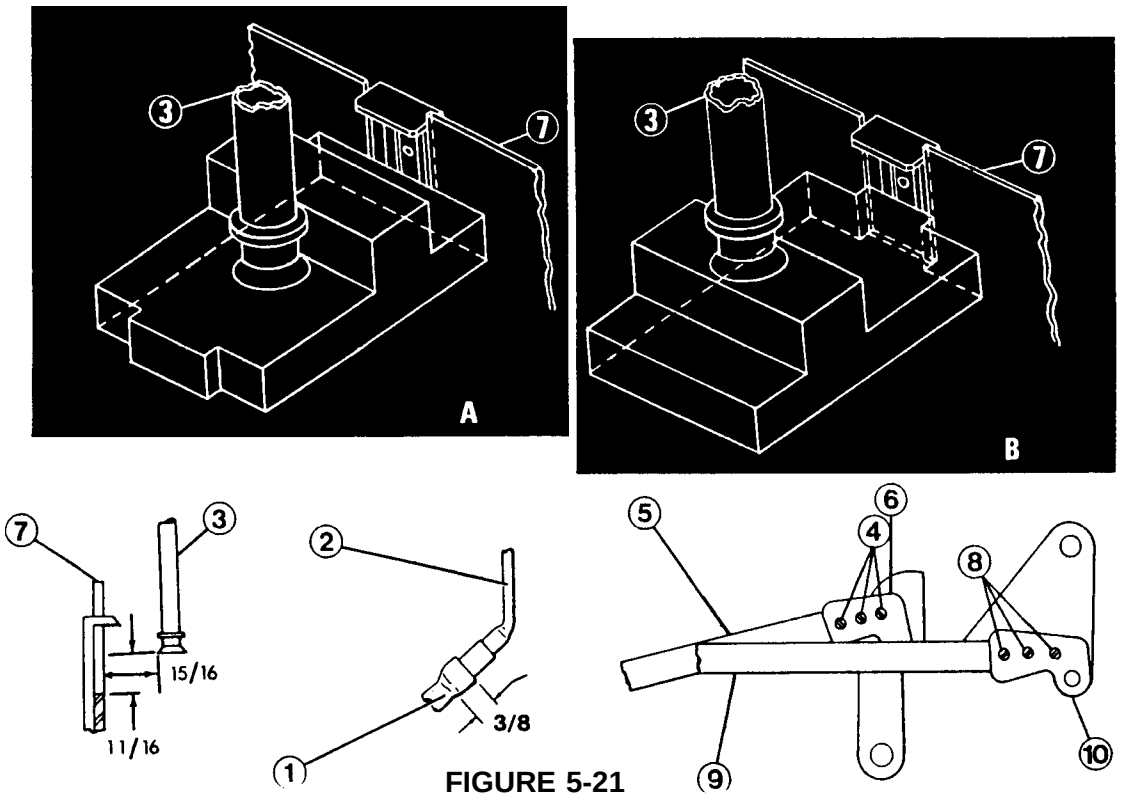


FIGURE 5-21

FEED RAISING AND SUCTION FOOT SHAFTS

The Feed Raising and Suction Foot Shafts must operate freely without end-play.

1. Locate the Feed Raising Shaft (1) on the non-operator side of the machine. (Figure 5-22)
2. Loosen the screws (2). Adjust the collar to eliminate the end-play of the shaft (1). Tighten the screws (2).
3. Check that the shaft (1) does not bind.
4. Locate the Suction Foot Shaft (3) on the non-operator side of the machine.
5. Loosen the screws (4). Adjust the collar to eliminate the end-play of the shaft (3). Tighten the screws (4).
6. Check that the shaft (3) does not bind.

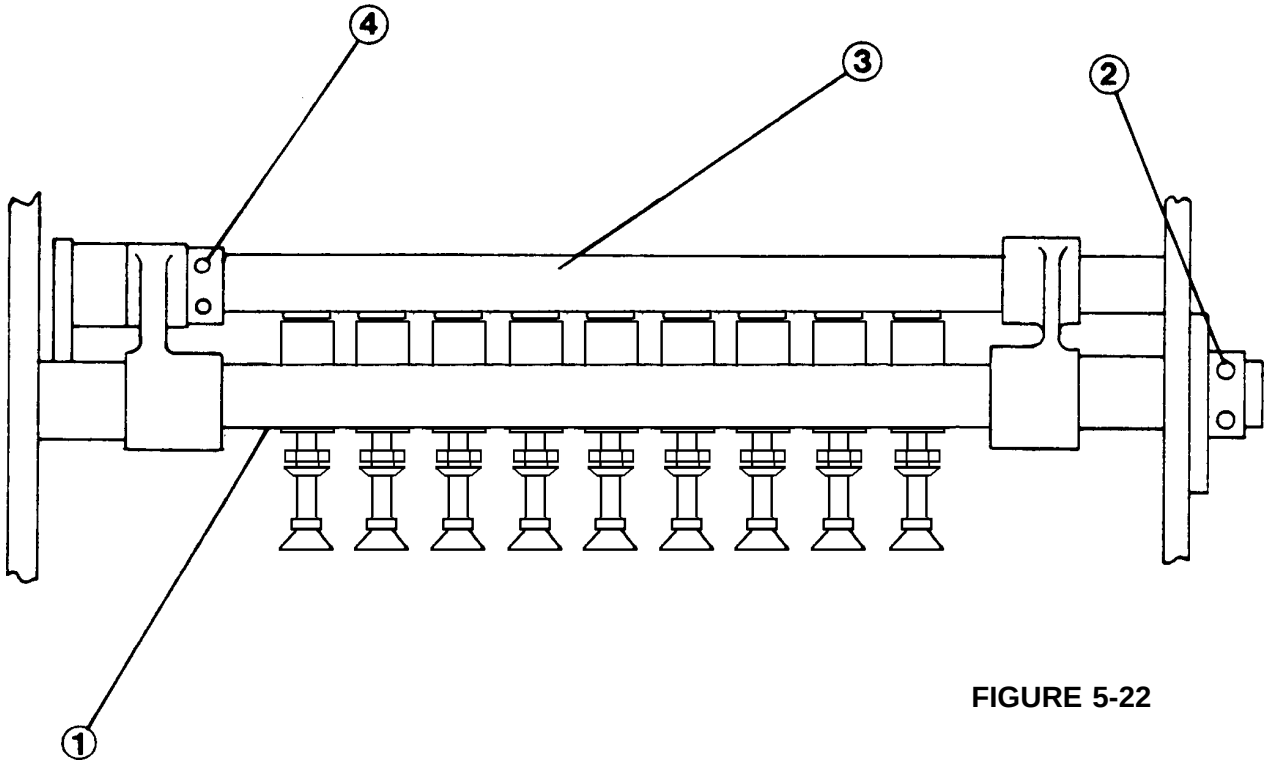


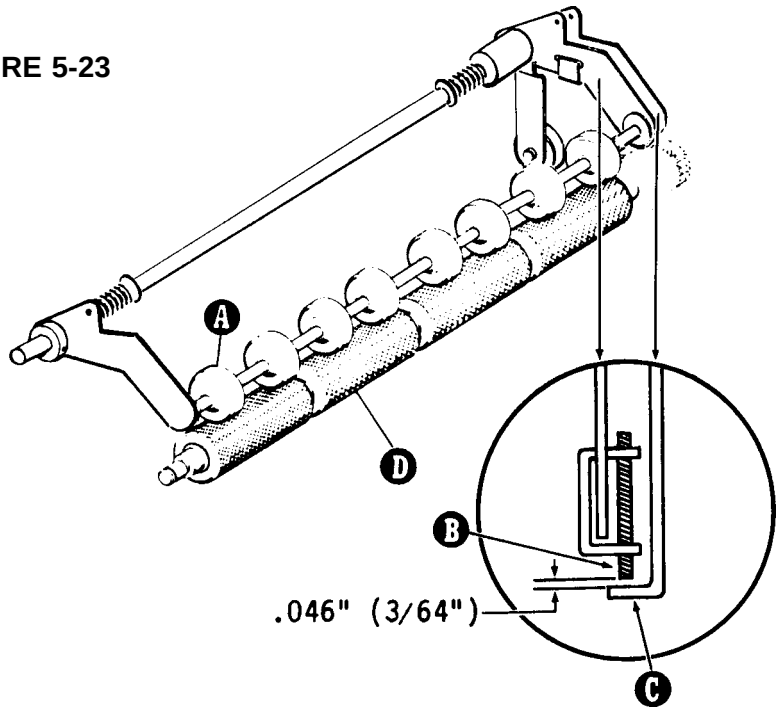
FIGURE 5-22

UPPER FORWARDING ROLLER

The Forwarding Roller must forward the paper to the grippers with the proper buckle, then lift to free the paper.

1. Check that the Forwarding Roller (A) revolves freely with a minimum of end-play. (Figure 5-23)
2. Check that the tips of the adjustment screws (B) (on both the operator and non-operator sides) are flush with the underside of the lower ears on the levers (C). If not, adjust them.
3. Turn the handwheel until the Forwarding Roller Carrier (A) is fully down in contact with the metal Forwarding Roller (D), and there is maximum clearance between the bottom of the adjustment screws (B) and the lower ears of the Forwarding Roller Operating Lever (E).
4. Adjust the screw (B) on the non-operator side Carrier Lever to obtain a .046" (3/64") clearance between the screw and the lower ear of the Operating Lever (E) (use right Angle Gauge, P/N 197058).
5. Insert two 1" wide strips of 20# paper (one on each end) between the second rubber forwarding roller from the end and the metal forwarding roller. Turn the handwheel to find the point at which the rollers release the non-operator side strip of paper.
6. Adjust the operator side adjustment screw so both strips of paper release at the same time as the handwheel is turned. Do not readjust the non-operator side adjustment screw.

FIGURE 5-23



FEED CONTROL LATCH LEVER AND SOLENOID

The Feed Control Latch must freely engage and disengage with its Stop Pin.

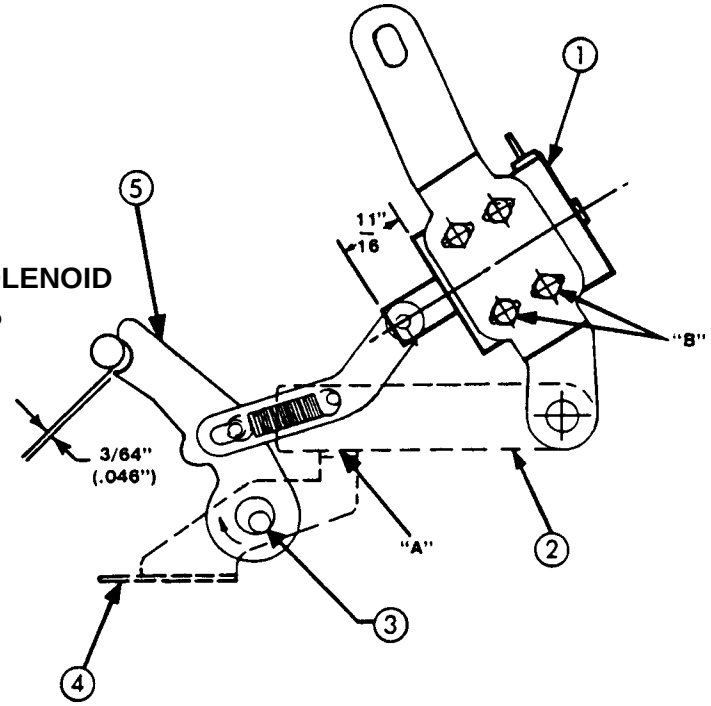
NOTE:

The Latch Lever must be in the FEED OFF position as shown in Figure 5-24.

1. Turn the handwheel until the sucker feet are in the extreme “up” position.
2. Adjust the eccentric stud:
   a. Loosen the locknut (inside the operator side frame) so the eccentric stud can be turned.
   b. Adjust the eccentric stud (on the outside of the side frame) to its lowest position to attain the largest possible gap.
   c. Rotate the stud clockwise so that the Latch Lever clears the Stop Pin by 3/64" (.046").
   d. Hold the Stop Bracket in contact with the Mounting Bar at Point “A”, and tighten the locknut on the eccentric stud.
3. With the Latch Lever holding the sucker feet in the “up” position, loosen screws “B” and adjust the Feed Control Solenoid to the top of the slots in the mounting bracket. Tighten the screws “B”.

FIGURE 5-24

1. **FEED CONTROL SOLENOID**
2. **PAPER GUIDE STOP**
3. **ECCENTRIC STUD**
4. **STOP BRACKET**
5. **LATCH LEVER**



VACUUM MAKE AND BREAK LINK

The Vacuum Make and Break Link must be properly adjusted to assure proper feeding.

1. Turn the handwheel until the Vacuum Make and Break Cam (1) is in the low position as shown. (Figure 5-25)
2. Loosen the nut of the eccentric pin (2). Adjust the eccentric pin (2) until the truck (3) clears the low of the cam by .015".
3. Tighten the nut on eccentric pin (2).

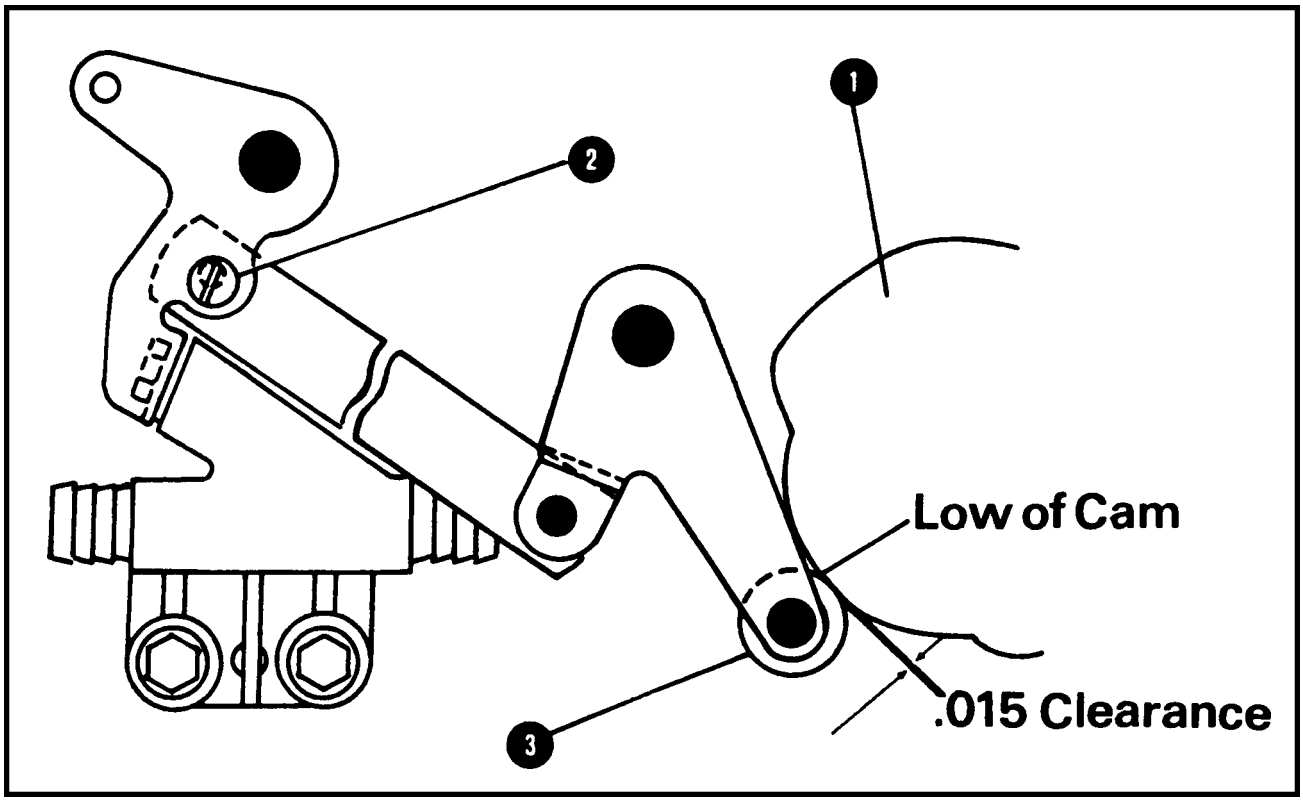


FIGURE 5-25

AQUAMATIC OSCILLATING ROLLER, INK REPELLENT WAVER ROLLER AND INK DUCTOR CAM

To secure uniform ink coverage:

A. The Aquamatic Oscillator and Form Oscillator must change direction when the Upper and Lower Form Rollers are in the open area of the Master Cylinder.

B. The Ink Ductor Roller must first contact the Distributor Roller when both Form Rollers are in the open area of the Master Cylinder.

C. The Aquamatic Oscillator Roller must be centered within approximately .020" (.51mm) at either extreme of travel with the Ductor Roller, and must not travel past the edge of the Ductor Roller at either end.

NOTE:

The machine must be at "0" Print Adjustment.

1. Place the Operation Control Lever in the NIGHT LATCH position.
2. Place the Lower Form Roller in the “ON” position.
3. Remove the taper pin (1) from the Cam Shaft Gear (2). (Figure 5-26)
4. Turn the handwheel until the largest hole in the Impression Cylinder Separating Cam (3) is in direct line from the center of the cam to the center of the Master Cylinder Support Arm Pivot Stud.
5. Remove the retainers (7), washer (8), and Operating Lever Link (9).
6. While holding the Cam Shaft Gear (2), disengage the Drive Gear (10) from the Waver Cam and Gear (15) by pulling the gear and shaft outward.

   Turn the Waver Cam and Gear (15) clockwise (viewed from the non-operator side) until the Oscillator Rollers have traveled to their extreme at the non-operator side.

   Slowly continue to turn the Waver Cam and Gear (15) clockwise until the Waver Cam surface contacts the roller (16) and removes the slack from the Waver Operating Lever (17).

   The hole in the Waver Cam and Gear should be at approximately twelve o’clock (12:00). (You are removing the time lag in the Waver Arm for changing direction of the Oscillator Rollers.)

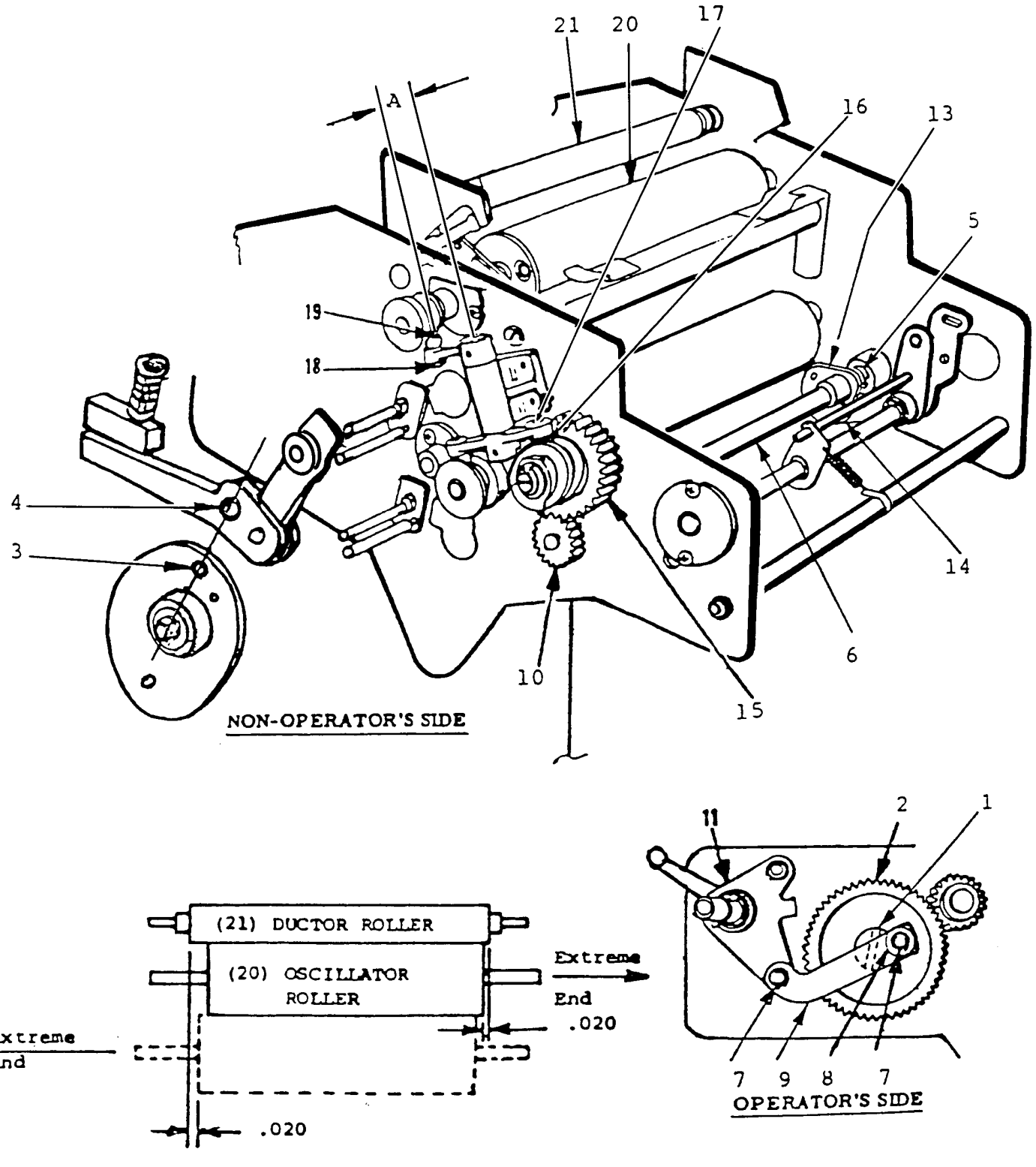

21
20
17
A
16
13
5
19
18
4
3
14
6
10
15
NON-OPERATOR'S SIDE
11
2
1
(21) DUCTOR ROLLER
(20) OSCILLATOR ROLLER
Extreme End
.020
Extreme End
.020
7
9
8
7
OPERATOR'S SIDE

FIGURE 5-26

7. Turn the Drive Gear (10) in a clockwise direction to position the Ink Ductor Cam (13) so the Ductor Lever Truck just precedes the high (hole in the cam will be at nine o'clock [9:00]) when viewed from the non-operator side.

   Engage the Drive Gear (10) and the Waver Cam and Gear (15). Double-check the relation of the Ductor Truck (14) and the cam (13). Relocate if necessary.

8. Holding the Drive Gear (10) in place, replace the Cam Shaft Gear (2) and the taper pin (1).

NOTE:

If the Taper Pin Hole in the Gear and Shaft is not easily accessible, insert an allen wrench (or some substitute) in the holes to maintain the relation and turn the Handwheel for a convenient position.

Replace the Operating Link (9), washer (8), and retainers (7).

9. Check that the required functions are met:
   a. The Aquamatic Oscillator and the Lower Form Oscillator Roller must change direction when the Upper and Lower Form Rollers are in the open area of the Master Cylinder.
   b. The Ink Ductor Roller must first contact the Distributor Roller when the Lower Form Roller is in the open area of the Master Cylinder.

10. Loosen the locknut (18) and turn the eccentric screw (19) either way until Distance "A" is at a minimum. Adjust the eccentric screw (19) to center the Aquamatic Oscillator Roller (20) with the Ductor Roller (21).

    Tighten the locknut (18).

NOTE:

The distance from the end of the Aquamatic Oscillator Roller to the end of the Dampener Form Roller must be approximately .020" (.51mm) when the Roller is on the extreme ends of each oscillation. At no time should the Oscillator Roller pass the edge of the Ductor Roller at either end.

DUCTOR LEVER TRUCK TO CAM AND INK DUCTOR LATCHOUT

The Actuating Shaft Truck must be adjusted for proper ink ducting.

The Ink Ductor Lockout Lever must lock out the Ductor Roller when in the “OFF” position.

1. Rotate the cam to the center point of the “low” in relation to the truck. (Figure 5-27)
2. Loosen the nut on the Truck and Stud Assembly. (Figure 5-28)
3. Rotate the stud on the Truck Assembly until a clearance of .051" (1.30mm) is achieved between the truck and the center of the “low” on the cam. (Figure 5-27)
4. Tighten the nut and stud, being sure that the stud does not rotate while the nut is being tightened.
5. When the Ink Ductor Latchout Lever is in the “OFF” position, the Ink Ductor Roller should remain in full contact with the Distributor Roller at all times.
6. To adjust, turn the handwheel until the Ductor Cam is at its high point holding the Ink Ductor Roller against the Distributor Roller.

   Loosen the screw “C” and move the top spring mounting stud toward the Ink Fountain until the excess movement on the Latchout Lever is removed. Tighten the screw “C”. (Figure 5-28)
7. Check to ensure that the Ink Ductor Roller fully contacts the Ink Fountain Roller. Readjust if necessary.

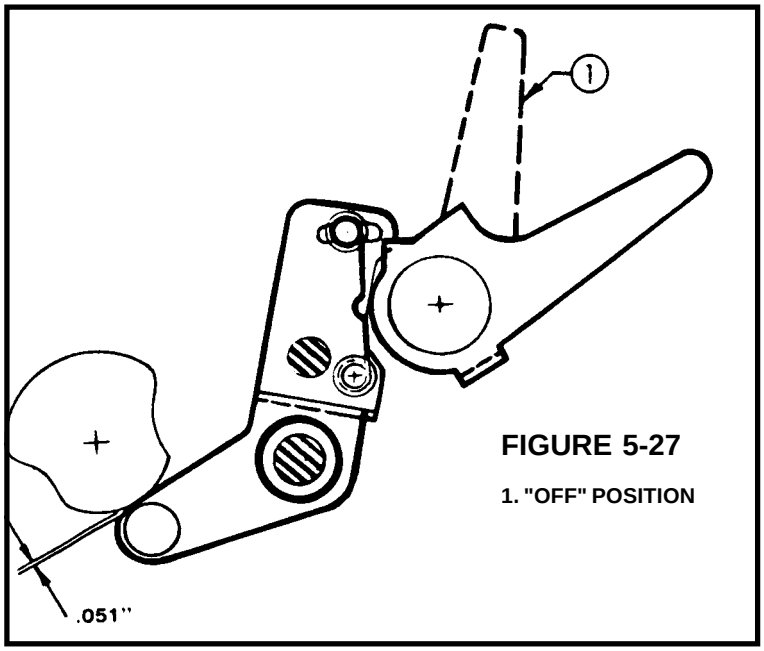


FIGURE 5-27

1. "OFF" POSITION

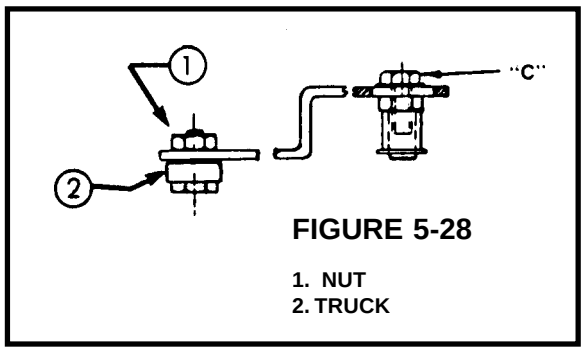


FIGURE 5-28

1. NUT
2. TRUCK

NOTES

LATERAL INK FORM AND RIDER ROLLER

Form Rollers must revolve freely with a .005 to .010 end-play. Rider Rollers must revolve freely with minimum end-play.

NOTE:

The third Form Roller is not in the machine for this adjustment.

1. Turn the Aquamatic Night Latch Lever (1) to the OFF (NIGHT LATCH) position and remove the Aquamatic Oscillating Roller from the machine. (Figure 5-29)
2. Turn the Upper Form Roller (2) to the OFF position and the Lower Form Roller (3) to the ON position.
3. Check that the Operation Control Lever moves freely through all positions. Return the Operation Control Lever to the NIGHT LATCH position.

⚠ CAUTION:

Do not force the Operation Control Lever.

4. With the Operation Control Lever in NIGHT LATCH and the Form Rollers in the position described in Step 2, loosen the set screws in the Non-Operation Side Form Roller Levers and adjust and adjust the sleeve bearing on the Non-Operator Side for a .005" to .010" (.13mm to .25mm) end-play. Retighten set screws and check that both rollers rotate freely.

NOTE:

There may be sufficient end play to allow the A Form Roller to spin freely, but because of improper adjustment of the Eccentrics the Form Roller will drag on the Lower Oscillator Roller (4). This usually applies to the Lower Form Roller, but both the Upper and Lower Roller action should be checked.

5. Remove the Ink Oscillator Roller/s (5) and the Rider Rollers from the machine.
6. Do the following to <u>each</u> Rider Roller Assembly: Position a bearing, at one end of the shaft, against the retaining ring. Place a .002" shim between the bearing and the collar holding the parts tightly against the retaining ring, tighten the collar set screw, and remove the shim.
7. Place one Rider Roller from Step 6 in the machine at any position. Position a .002" shim between the bearing and the <u>loose</u> collar. Spread the collars apart, at both ends of the shaft, to remove all end-play, keeping the shim in place, tighten the set screw of the loose collar.
8. Using the same Rider Roller that was used in Step 7, reposition it in the other Rider Roller positions, leaving the .002" shim in place. If any other roller position is a tight fit for the bearings, reset the collar, next to the shim (as in Step 7), continue checking all of the Rider Roller positions until Rider Roller Assembly, with shim in place, no longer has a tight fit. After all the Rider Roller positions have been checked, tighten the adjusting collars securely and remove the shim.

9. From Step 8, determine which Rider Roller position has the least amount of end-play. Using this position only, repeat Step 7 for all the other Rider Roller assemblies.
10. All the Rider Rollers assemblies will now fit of the Rider Roller positions, in a specific machine, with minimum end-play. Replace all of the Ink Oscillator and Rider Rollers.

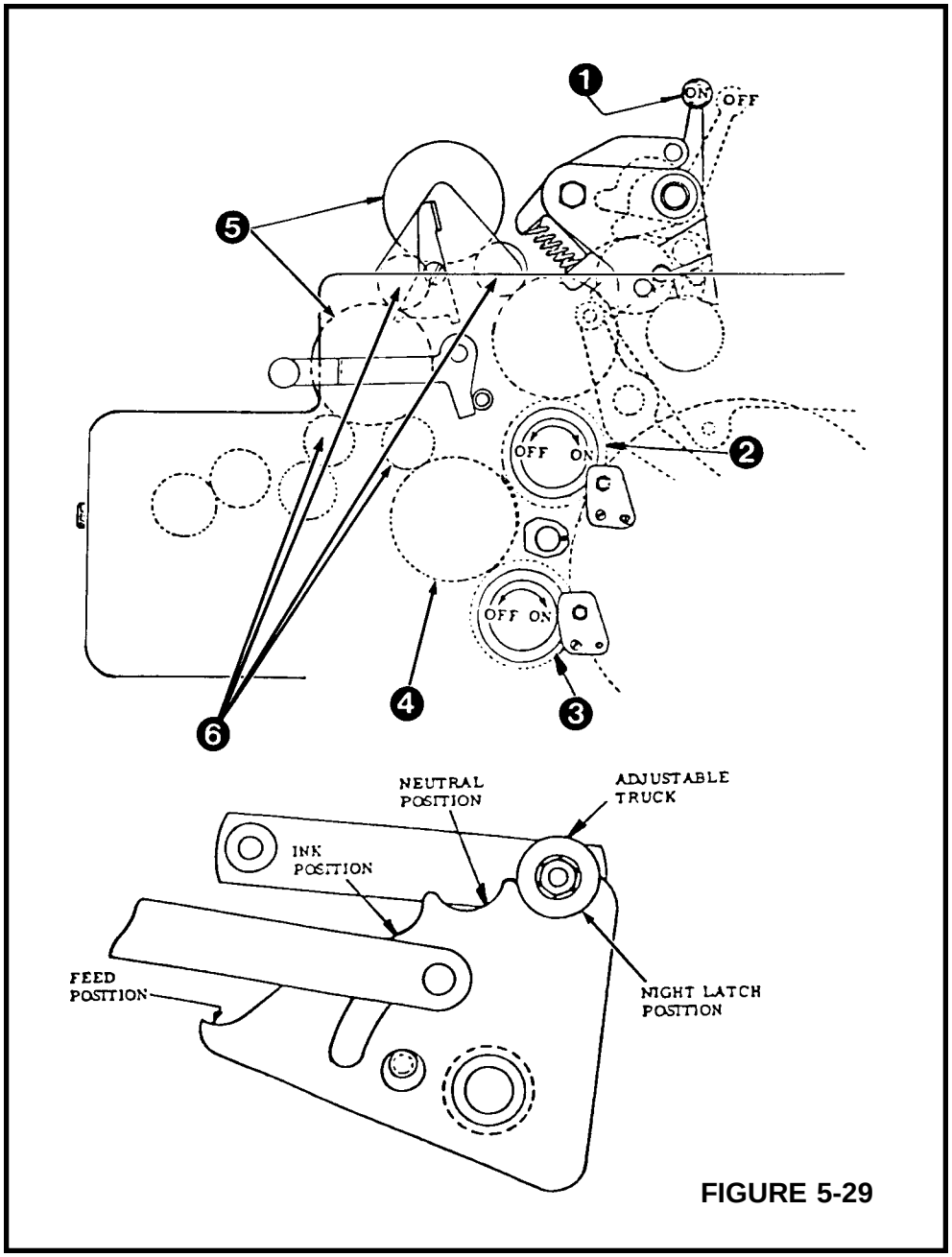


FIGURE 5-29

UPPER AND LOWER INK FORM ROLLER PRESSURE

To assure copy quality, the Form Rollers must contact the master or plate under proper pressure.

NOTE:

Adjust the Form Roller End-Play before making this adjustment.

1. Position the following: Operation Control Lever to INK Form Roller Knobs to “OFF” Aquamatic Control to “45”
2. Ink the ink roller system without the Auxiliary Form Roller Assembly installed in the machine.
3. Turn off the machine and attach a 4000 Series Master to the Master Cylinder.
4. Turn the handwheel until both Form Rollers are in a position where they can contact the master.
5. Adjust the four plates (1). (Figure 5-30)

   On each plate:

   a. Loosen lock screw (2).

   b. With the plate (1) flat against the frame, tighten locknut (3) until snug.

   c. Loosen locknut (3) just enough to allow adjusting screw (4) to turn 360° freely.

   d. Tighten lock screw (2).

NOTE:

If the Plates (1) are not adjusted properly, the Adjusting Screws (2) will bind and the Form Roller Levers will bind.

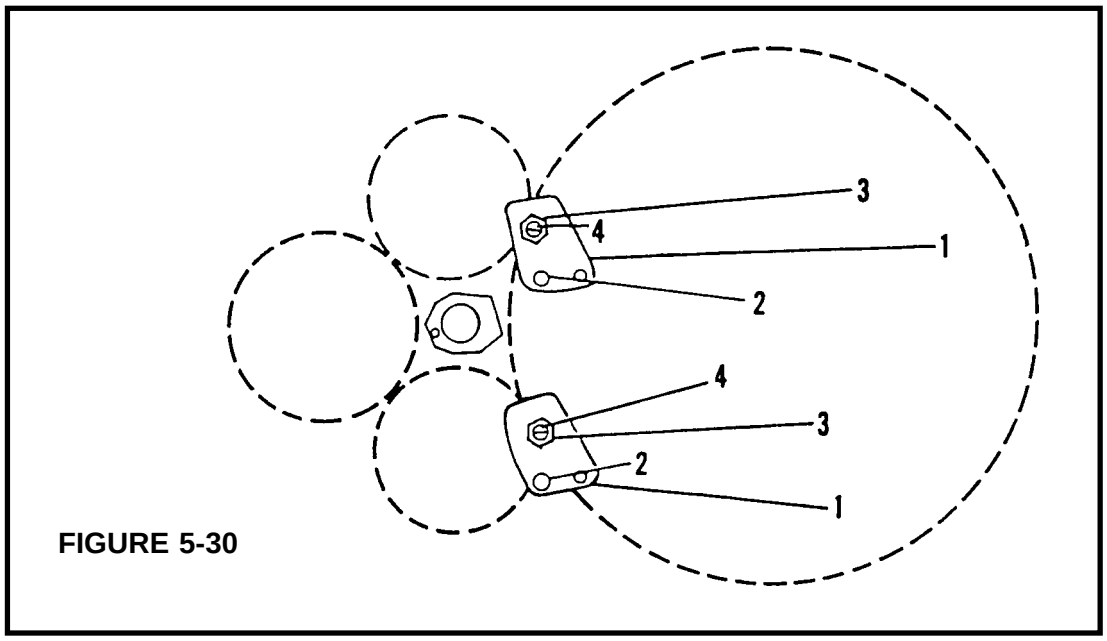


FIGURE 5-30

6. Take an upper and a lower bead line:
   a. Gently turn each Form Roller Knob ON, then OFF.
   b. Check the ink bead lines on the master for the following widths:

      Upper Form Roller: 1/8" to 5/32" (3.2mm to 4.0mm)
      Lower Form Roller: 5/32" to 3/16" (4.0mm to 4.8mm)

   The line width should be uniform within 1/64" (.040mm).
7. If necessary, adjust the roller pressure to attain the proper bead line widths.
   a. Loosen lock screw (2).
   b. Hold the adjusting screw (4) with a screwdriver to keep it from turning, and loosen locknut (3).
   c. Adjust screw (4) according to the chart to INCREASE the bead line width. Adjust it opposite to the chart to DECREASE the bead line width.
   d. Tighten locknut (3) while holding the adjusting screw (4) with a screwdriver.
   e. Tighten lock screw (2).

TO INCREASE FORM ROLLER PRESSURE:

Upper Form Roller:	Turn top of screw (4) towards feed end of machine Operator side = clockwise Non-operator side = counterclockwise
Lower Form Roller:	Turn top of screw (4) towards delivery end of machine Operator side = counterclockwise Non-operator side = clockwise

NOTE:

If the bead line does not increase according to the chart when Screw (4) is turned, the operator and non-operator adjustment screws may be 180° out of alignment. In this case, turn Screw (4) to position the Form Roller at its maximum distance from the Master Cylinder, then adjust according the chart.

   f. Recheck the bead line width. Readjust if necessary.

   g. The eccentric screws (4) may be marked to indicate the high point of the eccentric. Once satisfactory bead lines have been attained, check the markings on the screws (4).

      The opposing screws (4) must be close to the same position on both sides of the machine, or they are 180° out of alignment (and need to be readjusted). The markings on the upper adjustment screws should face upwards at approximately an 11:00 to 1:00 position. The markings on the lower screws should be positioned down at approximately 5:00 to 7:00.

8. Recheck the Operation Control Lever Detent adjustment.

NOTE:

If the Form Rollers are removed from the machine, they must be identified so they cannot be interchanged.

Using a center punch and a small hammer, identify the Form Rollers with center punch marks while still in the machine. Put one mark on the operator side of the Upper Form Roller and two marks on the operator side of the Lower Form Roller. (Figure 5-31)

9. Return the Operation Control Lever to NEUTRAL and the Form Roller Knobs to the “ON” position.

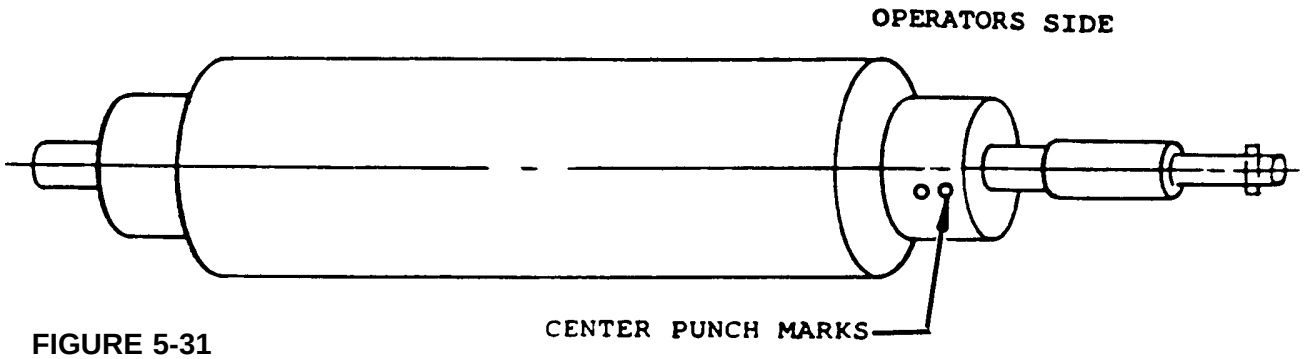


FIGURE 5-31

THIRD FORM ROLLER ADJUSTMENT

1. Ink the Ink roller system without the Third Form Roller Assembly installed in the machine. Attach a 4000 Series Master to the Master Cylinder.
2. Adjust the eccentric studs (A) on the operator and the non-operator sides to the maximum up position (smaller end up as seen from inside the machine). (Figure 5- 32)

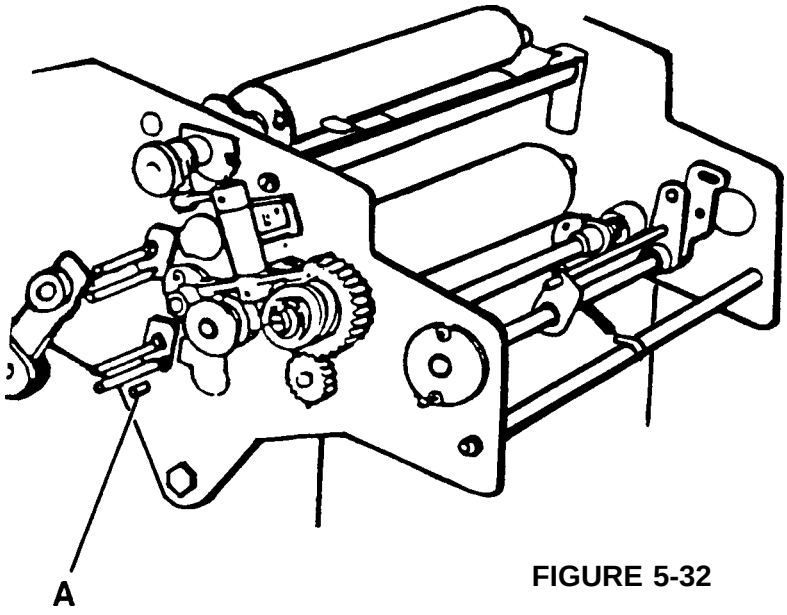


FIGURE 5-32

3. Slightly loosen bolts (B) (C) and (G) on the operator and the non-operator sides. (Figure 5-33)
4. Adjust the hex eccentrics (D) on the operator and non-operator sides so the upper pivot on the carrier brackets are at the maximum inward position toward the Master Cylinder.
5. Install the Third Form Roller Assembly into the machine. The operator side arm must engage the slot in the guide bracket (E). Both the Operator and Non-Operator Sides must engage brackets (H). Lock the assembly in place with the slide catches (one on each side).
6. Thread the carrier arm lock screws into the trunnions (F), and tighten them until the shoulders of the screws are seated on the flats of the trunnions.
7. Be sure the Form Roller Knobs are in the ON position and the Operation Control Lever is in the neutral position.
8. Turn the machine on and ink up the Third Form Roller.
9. Turn off the machine.
10. Adjust the hex eccentrics (D) on the operator and non-operator sides for the maximum inward position of the Third Form Carrier Arms (toward the Master Cylinder). Do this by turning the operator-side eccentric counterclockwise (viewed from inside the machine), and the non-operator side eccentric clockwise (from inside).
11. Place the Operation Control Lever in the INK position and then return it to the NEUTRAL position. The bead line for the Third Form Roller must be 1/8" to 5/32" wide. If not, readjust the hex eccentrics (D) and repeat this procedure.
12. After a satisfactory bead line is achieved, and with the Form Roller Lever in the ON position and the Operation Control Lever in INK, adjust the stud eccentrics (A) on the operator and non-operator sides so they both just contact the carrier arms (inside the machine). Do this by turning the operator side eccentric clockwise and the non-operator side eccentric counterclockwise.
13. Recheck the bead line as in step 11.
14. Retighten bolts (B) and (C).

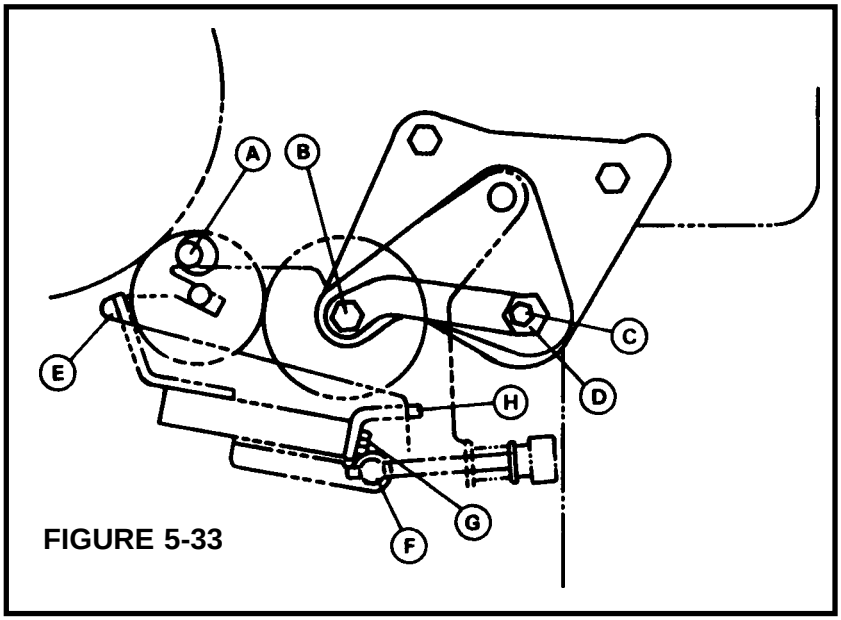


FIGURE 5-33

PRINT RAISE-LOWER STRIP

When the Raise-Lower Mark is at “0”, the copy 49/64" below the top of the holes on a pinbar plate should fall 1/2" from the lead edge of the paper. (Figure 5-34)

1. On a pinbar metal plate, expose a line exactly 49/64" below the top of the holes in the plate.
2. Attach the plate and duplicate copies.
3. Measure the line of copy from the lead edge of the sheet. This line should be 1/2" from the lead edge.
4. Adjust the Print Raise-Lower Control to obtain copy 1/2" from the lead edge.
5. Set the Raise-Lower Plastic Strip with its center gradation line on the “0” mark of the Ring Gear Strip.
6. Drive the two rivets home.

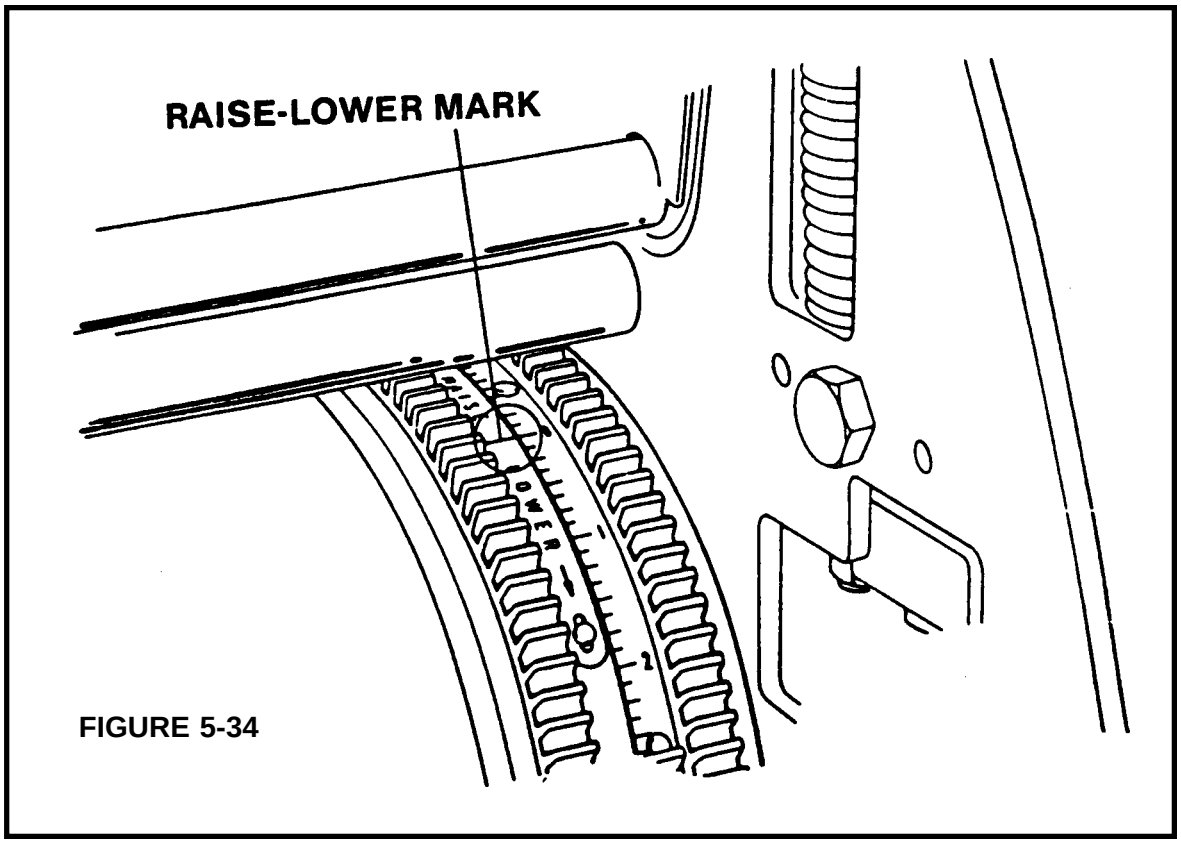


FIGURE 5-34

MACHINE TO CLOCK SYNC MECHANISM TIMING

The Synchronization Sensor must be timed to correctly synchronize the electronic and mechanical functions of the machine.

1. Align all the machine timing marks. Make sure the tooth on the Impression Cylinder Gear is exactly in the center of the tooth space in the Blanket Cylinder Gear.
2. Loosen both set screws (4) on the Hall Effect Disk Shaft. (Figure 5-35)
3. Rotate the Hall Effect Disk so that the hole in the wheel is centered over the Sync Sensor (2) located on the P.C. Board.
4. Set the gap between the Hall Effect Disk and the sensor to approximately 030" (.76mm). Tighten both set screws.

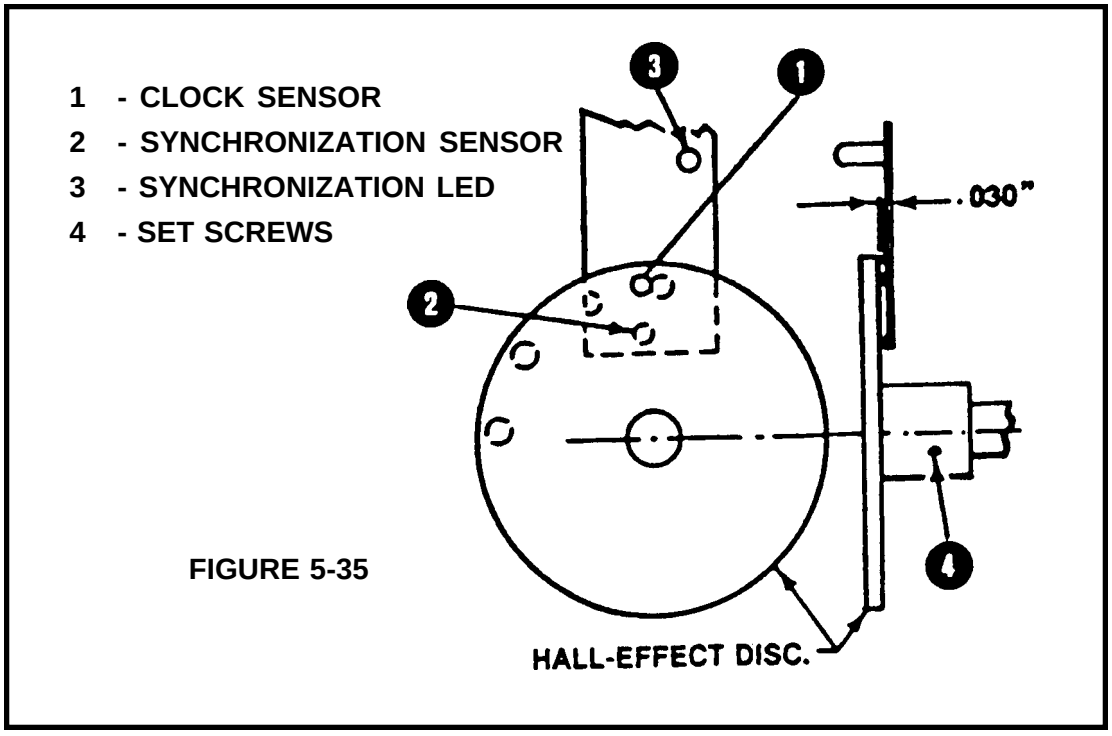


FIGURE 5-35

NOTES

CHAIN DELIVERY ADJUSTMENTS

Chain Adjustments and Timing Check

The springs must provide proper tension to the Drive Chains. The joggers must be properly timed to prevent trapping the sheet before the sheet is released by the Chain Grippers.

NOTE:

Do not operate the Chain Delivery under power until the following steps have been checked and, if necessary, the adjustments are made.

1. Check the tension of the Compression Springs (operator and non-operator sides). The tension is correct if the springs are compressed to 1-1/4" (32mm). (Figure 5-36)

   If necessary, adjust by performing the following steps:

   a. Loosen nut (1).

   b. Turn the adjusting screw (2) so the springs are compressed to 1-1/4" (32mm).

   c. Tighten nut (1) against block (3).

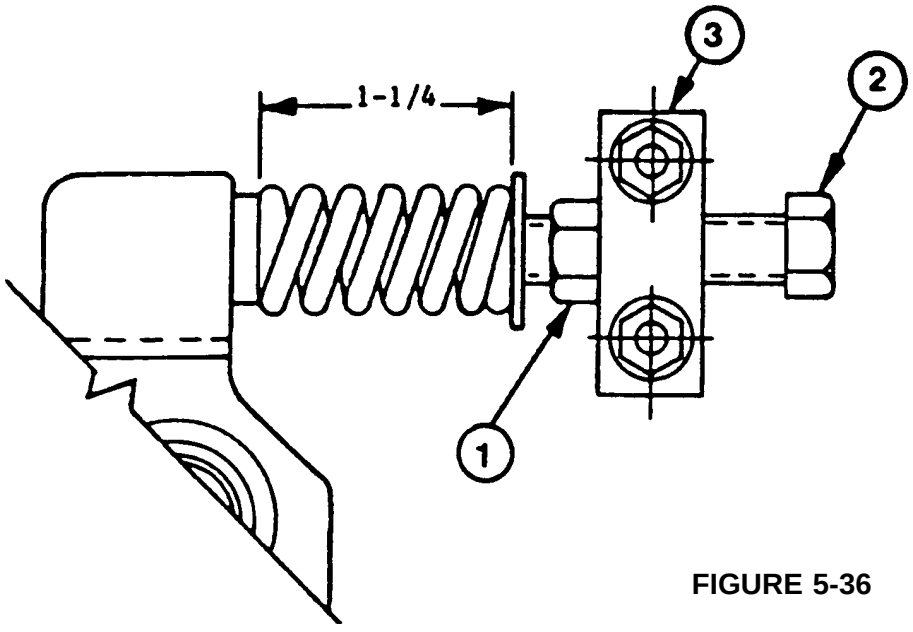


FIGURE 5-36

2. Check the Chain Delivery timing:
   a. Turn the handwheel until all timing marks on the machine are aligned.
   b. Ensure that the timing holes in the sprocket and gear are approximately in the position shown (4) and are in line with each other within one gear tooth space. (Figure 5-37)
3. If the timing does not meet the above requirements, adjust by performing the following steps:
   a. Remove the Gripper Bars and the operator side chain.
   b. With all timing marks aligned, the Gripper Bar Attachment Links on the chains must be on the teeth in the Main Drive Sprockets that have timing marks.
   c. Set the Idler Sprocket (5) so the timing hole in the sprocket is in position within one sprocket tooth space.
   d. Remove the Cam Assembly (6) and reinstall it so the timing holes in the sprocket and gear (4) line up within one gear tooth space.
   e. Reinstall the chain and the Gripper Bars.

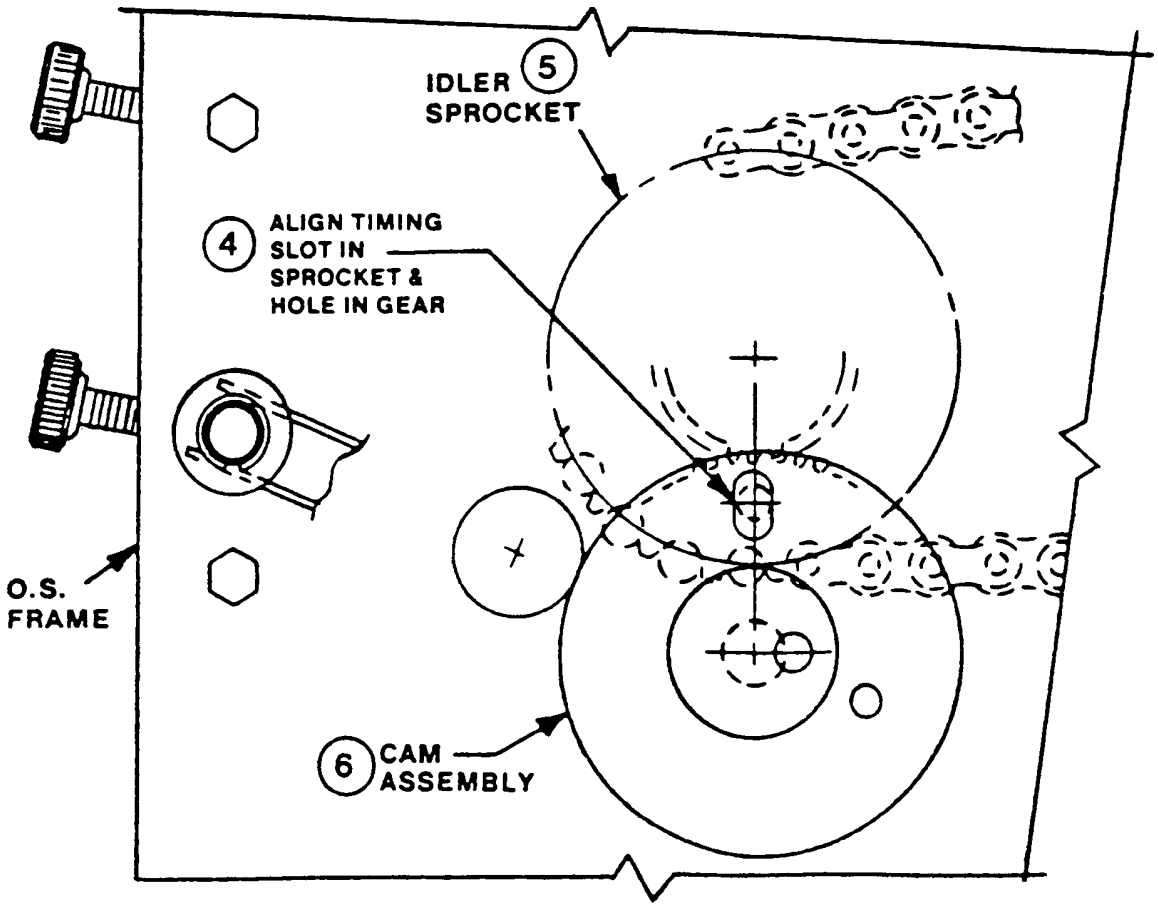


FIGURE 5-37

Gripper Bar Timing

The Chain Delivery Grippers must operate freely and the Gripper Bars must be properly timed to transfer paper from the Impression Cylinder Grippers to the Chain Grippers without nicking or dropping the paper.

NOTE:

Do not operate the Chain Delivery under power until the Gripper Bar Calibrations and the clearance between the Gripper Bars and the Impression Cylinder have been checked.

1. Manually turn the handwheel and check that all the Chain Delivery Gripper Bars clear the Impression Cylinder and its grippers.
2. Check that all Gripper Bars open and close freely.
3. Check that all cam followers are adjusted to 1.125", using the Chain Gripper Bar Gauge (P/N 191555).
4. It may be necessary to adjust the timing of the Chain Delivery Gripper to the Impression Cylinder Gripper. If required, adjust by performing the following steps:

⚠ CAUTION:

Extreme caution must be exercised when making this adjustment.

a. Loosen the three Sprocket Mounting Screws (2) (see Figure 5-38).

b. To advance the Chain Gripper, turn the sprocket clockwise; to retard the Chain Gripper, turn the sprocket counterclockwise.

NOTE:

Make very small movements of the Sprockets.

a. Tighten the three sprocket mounting screws.

b. Test all three gripper bars after each adjustment.

Screws.

d. Test all three Gripper Bars after each adjustment.

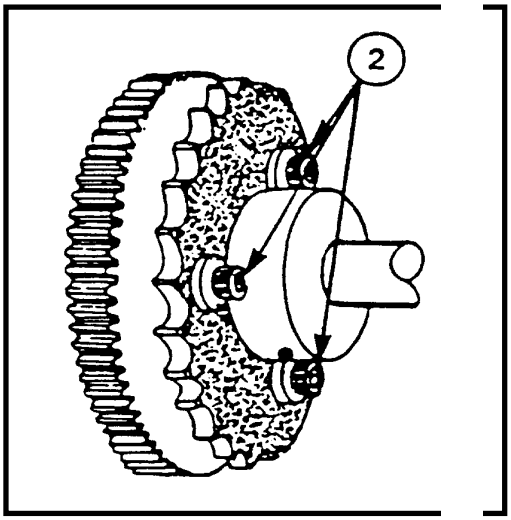


FIGURE 5-38

Control Lever

The Receding Stacker must descend with the Control Lever in Position “C”. (Figure 5-39)

1. Move the Control Lever (1) to position “A”.
2. Turn the handwheel until the pawl (2) is in its highest position (Position “B”).
3. Move the Control Lever (1) until the edge (3) passes through the base point (4) of the first ratchet tooth behind the pawl 2) (Position “C”).
4. Loosen the screws (7).

   Hold the Control Lever (1) in this position, and adjust the Control Ratchet (5) for pin (6) to fit into the second tooth.

   Tighten the screws (7).

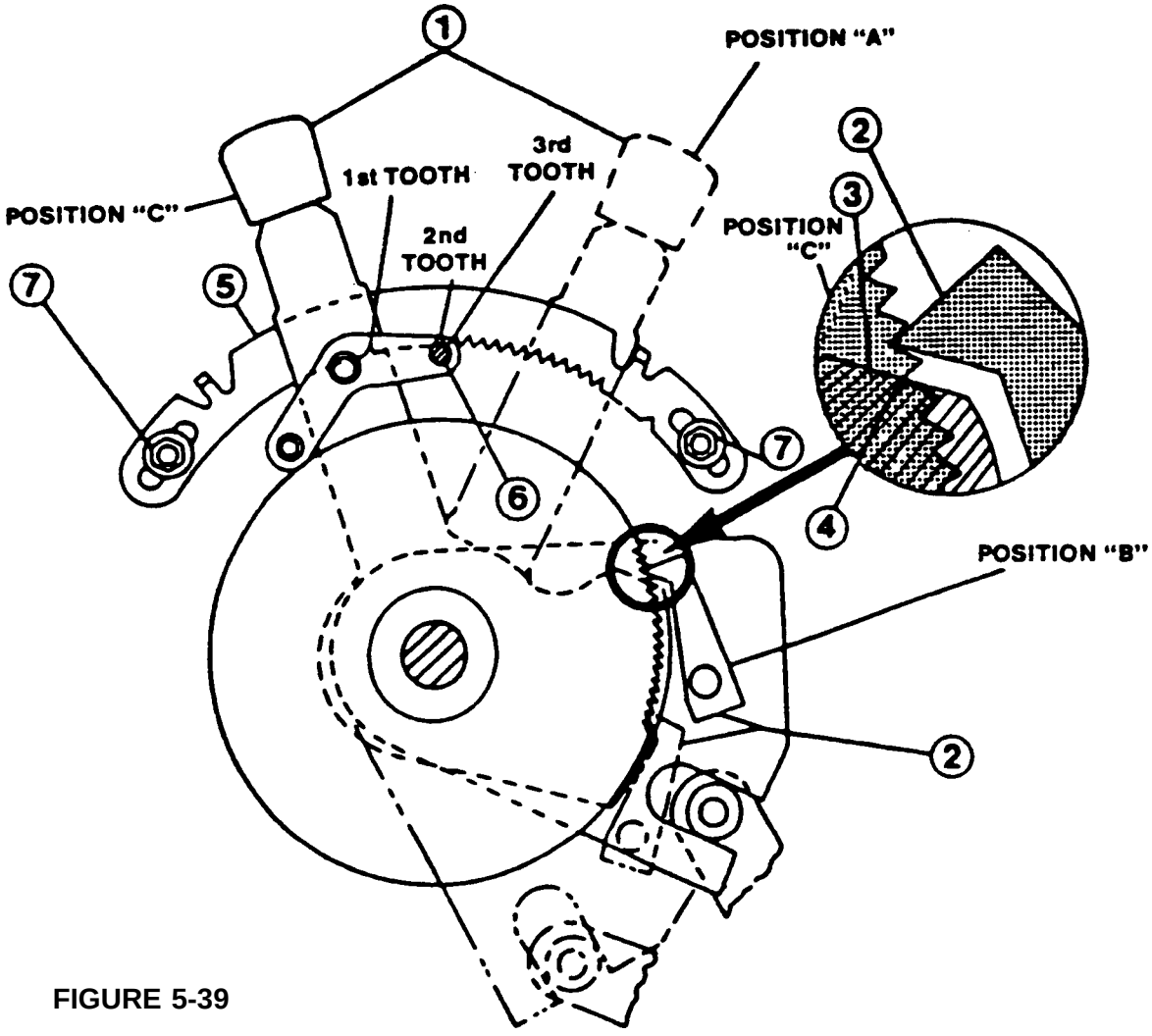


FIGURE 5-39

Paper Stop

The Paper Stop Assembly must be 90^0 to the horizontal surface of the dolly with the Paper Stop Locking Knob tightened.

1. With the dolly in the raised position and the Paper Stop Assembly in close proximity to the dolly, place a square on the horizontal surface of the dolly (1). Check to ensure that the Stop Assembly is at 90 to the dolly. (Figure 5-40)
2. If necessary, adjust by performing the following steps:
   a. Loosen nuts (2) which mount the Door Stops (3) and opposition the Door Stops so the Paper Stop Assembly (4) is at 90 to the Dolly.
   b. Tighten the nuts (2).

NOTE:

The Door Assembly should contact both the operator and non-operator side stops at the same time.

Side Jogger Check

If all parts are to specifications and have not been abused, the operator and non-operator side joggers should be parallel to the Chain Delivery Side Frames and each other within 1/32" (.79mm).

1. Using a 6" machinist's scale and checking from the machine surfaces on the joggers, check that the side joggers meet the specifications.

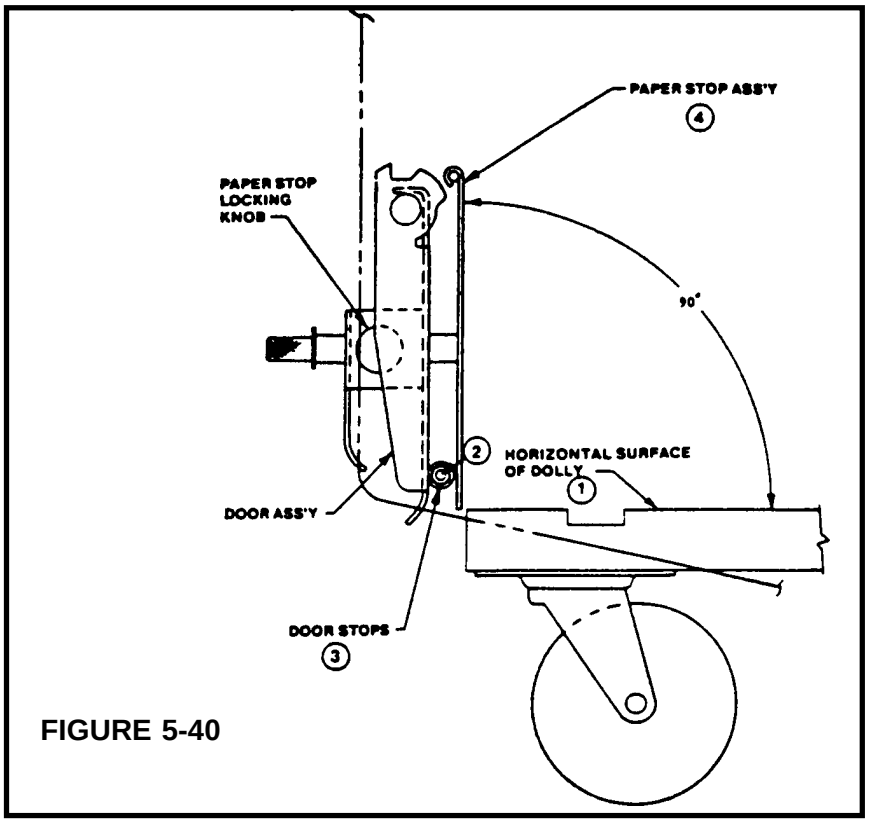


FIGURE 5-40

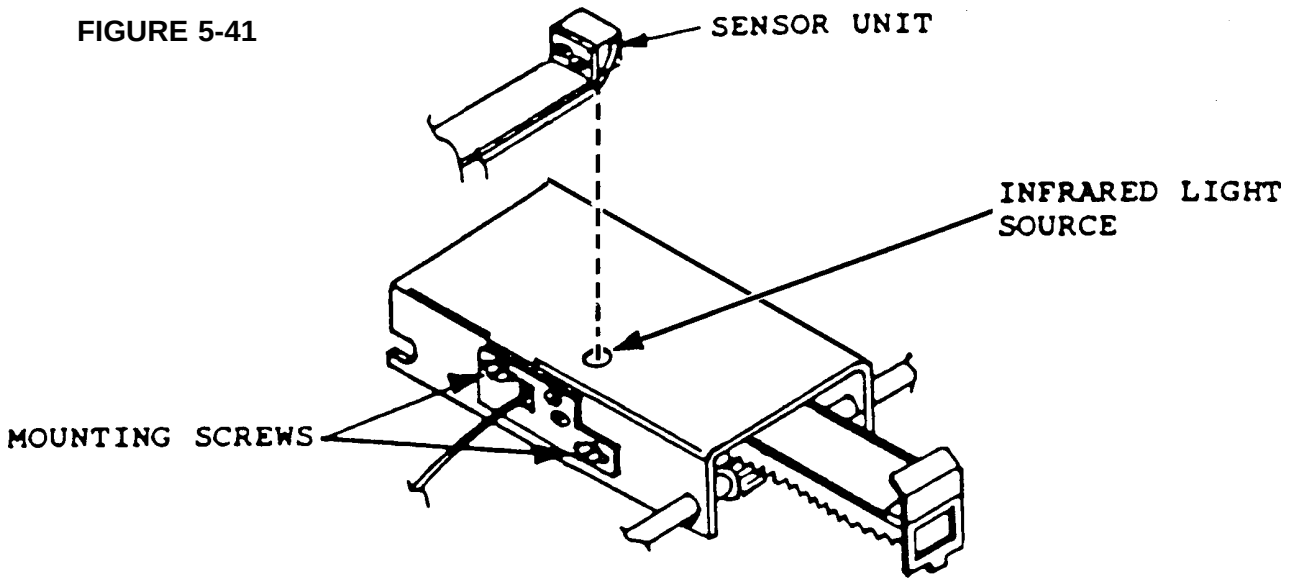
PAPER JAM DETECT

The Paper Jam Detect is a Beam Interrupt System, made up of a light source and a photodetector. The light source is an infrared LED type and it is not visible to the naked eye.

The light source and the photodetector must be aligned for the sensor to operate. The yellow LED on the Interface PC Board in the Control Box will light when the light source and Sensor Unit are properly aligned.

1. Loosen the light source mounting screws. Move the light source in the adjusting slot of its mounting bracket until the yellow LED (on the Interface PCB) comes ON. Note this position. Now move it until the LED goes OFF. Adjust the light source to the center of the ON and OFF positions and tighten the mounting screws. (Figure 5-41)
2. The LED should go OFF when the light source is covered and turn back ON when it is uncovered. Use a 20 lb. piece of paper to cover and uncover the light source several times. Observe the LED for proper operation. Readjust if necessary.

FIGURE 5-41



VACUUM PUMP PULLEY ALIGNMENT AND BELT TENSION

The Vacuum Pump Belt must have the proper tension and alignment to avoid undue wear on the belt and the Pump Motor.

1. Remove the Belt Guard.
2. Loosen the set screws in the Motor and Pump Pulleys. Align the pulleys to 2-3/4" ± 1/16" (70.0mm ± 1.6mm) from the Front Cover Panel. Tighten the set screws. (Figure 5-42)
3. Loosen the motor mounting bolts. Adjust the motor to allow a 1/2" ± 1/8" (12.7mm ± 3.2mm) deflection of the belt when approximately 1 lb. of force is applied to the belt midway between the two pulleys. Tighten the motor mounting bolts. (Figure 5-43)
4. Replace the Belt Guard.

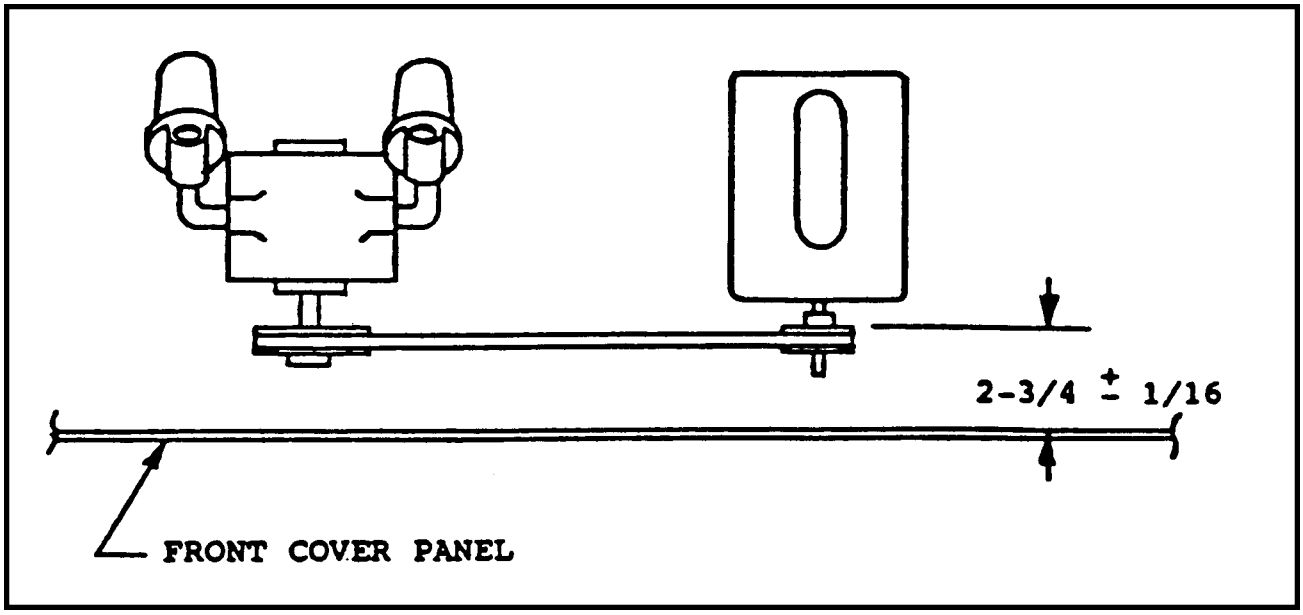


FIGURE 5-42

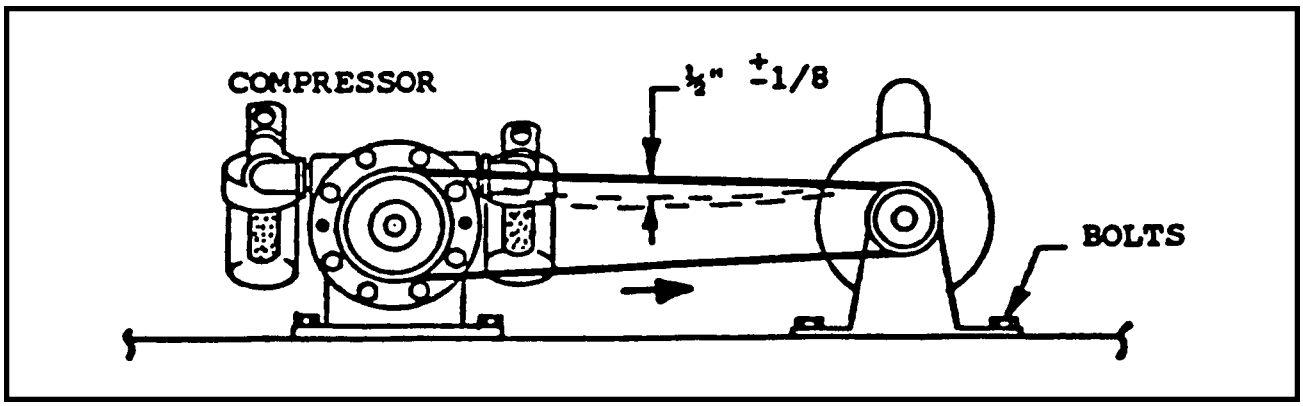


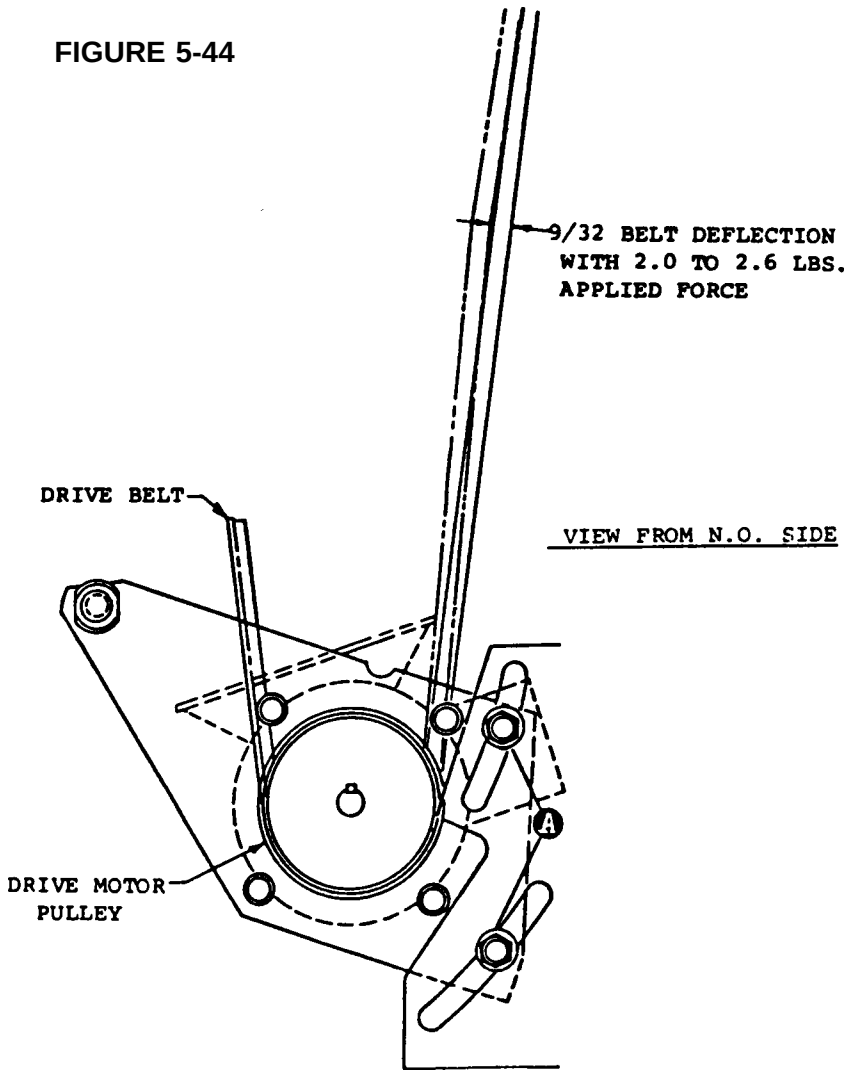
FIGURE 5-43

DRIVE MOTOR BELT TENSION

The Drive Motor Belt must have the proper tension to avoid undue wear on the belt and the Drive Motor.

1. Loosen screws “A”. (Figure 5-44)
2. If the belt needs replacing, swivel up the motor to remove and replace it.
3. Lower the motor. The weight of the motor will provide the proper tension to the belt.
4. Tighten screws “A”.
5. The belt should deflect 9/32" with a force of 2.0 to 2.6 lbs. applied. Readjust the motor if necessary to attain the proper tension.

FIGURE 5-44



DC POWER SUPPLY

Exactly 5.2V DC must be supplied to the boards and relays.

1. Turn the Main Power Switch ON. Push in the Emergency Stop Button.
2. Set the meter to the 20V DC range and connect the test leads to the terminals at the top of the Mother Board; red to +5.2V DC and black to “ground”. The voltage must read +5.15V DC to +5.20V DC. (Figure 5-45)

   If necessary, adjust the voltage by rotating the voltage adjustment pot located on the +5V DC Power Supply. (Figure 5-45)

⚠ CAUTION:

Do not turn the Limit Potentiometer (located to the right of the Voltage Adjustment Potentiometer). It is factory calibrated and is not to be adjusted in the field.

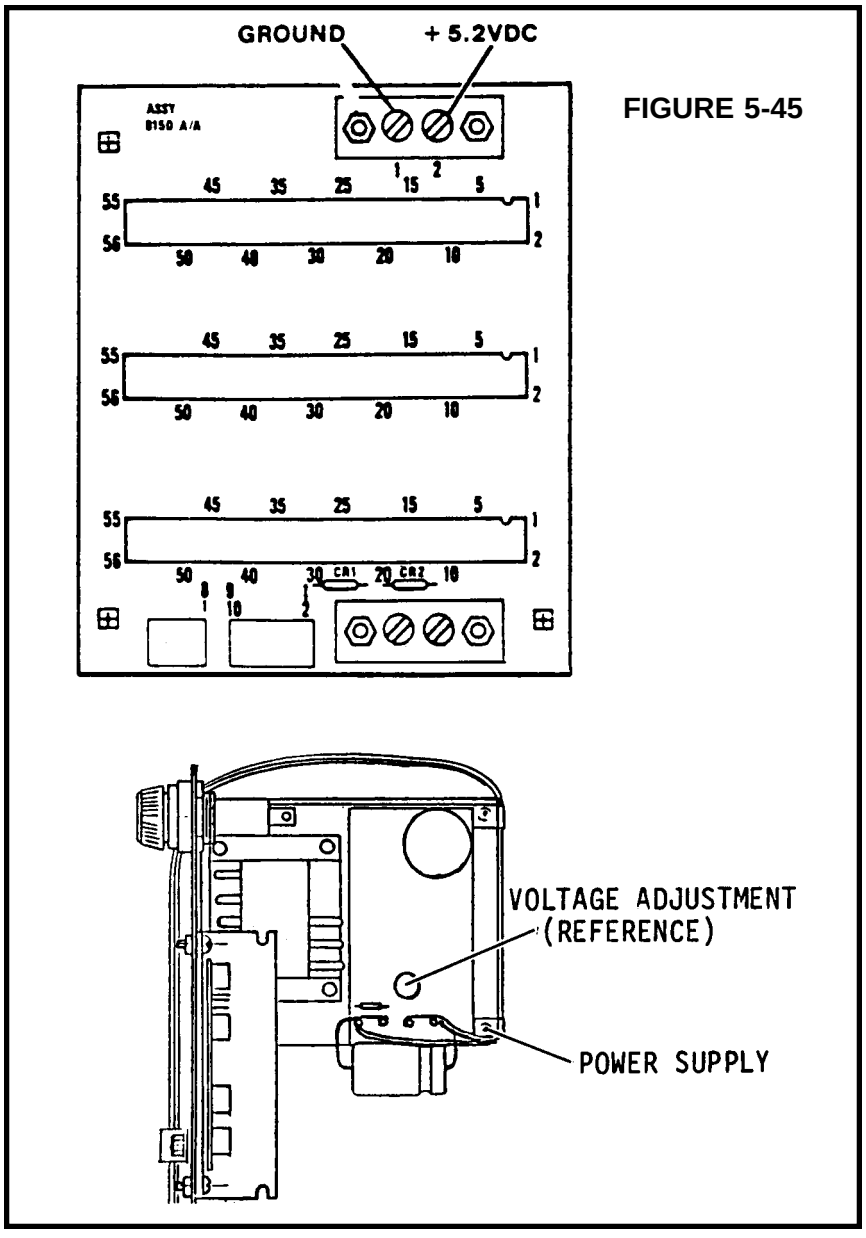


FIGURE 5-45

SAFETY GUARD SYSTEM

Guard Switches

All guards have a permanently fastened Switch Actuator Cam. The switches are mounted relative to the cam. (Figures 5-46 and 5-47)

1. With the guards closed, the switches should be in the non-actuated position. When the guards are lifted, both switches must be actuated, and the actuator should have overtraveled the trip point by approximately 1/64" (.4mm).
2. There should be free travel left in the actuated position for the switches so the actuator does not press directly on the closed switch mechanism.
3. If the switches do not meet the above specifications, loosen the two mounting screws and adjust the switches to specs. Tighten the screws and recheck the adjustment.

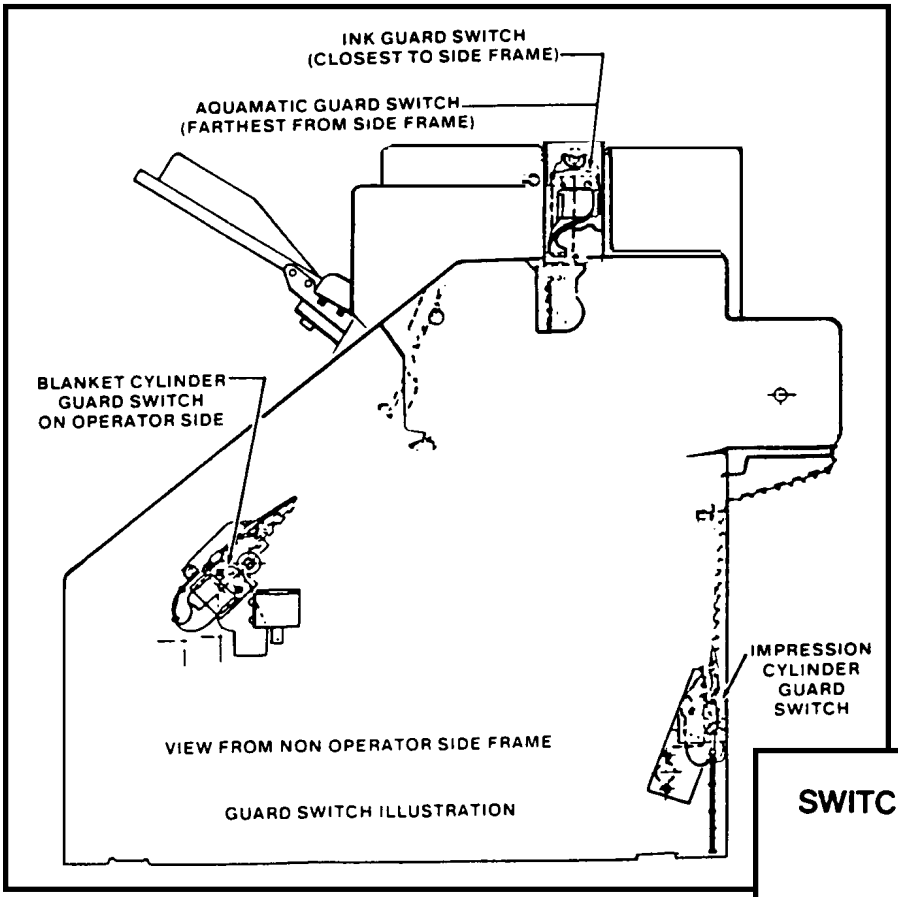


FIGURE 5-46

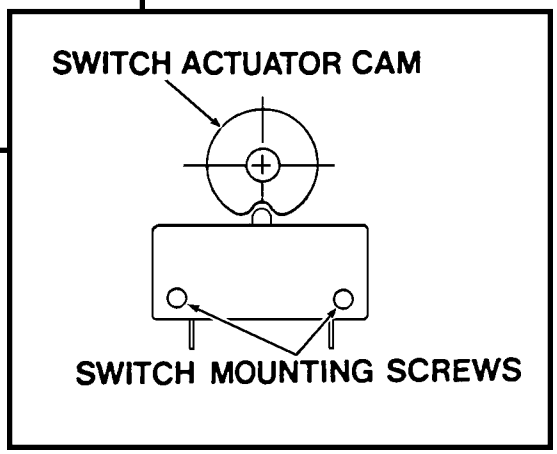


FIGURE 5-47

Side Jogger Check

If all parts are to specifications and have not been abused, the operator-side and non-operator side side joggers should be parallel to the chain delivery side frames and each other within 1/32".

Using a 6" machinist's scale and checking from the machine surfaces on the joggers, check that the side joggers meet these parallel specifications.

Chain Delivery Guard Microswitch Adjustment

With Guards (1), (2) and (3) in the closed position as shown, Switches (4), (5) and (6) must not be actuated by the Cams. Immediatelly after the Guards are lifted, the Switches must be actuated by the Cams (see Figure 5-48).

If the Switches do not meet the above specifications, adjust by performing the following steps:

1. Loosen the two mounting screws for either or both switches.
2. Adjust the switch(es) to specifications.
3. Tighten the mounting screws for the switch(es).

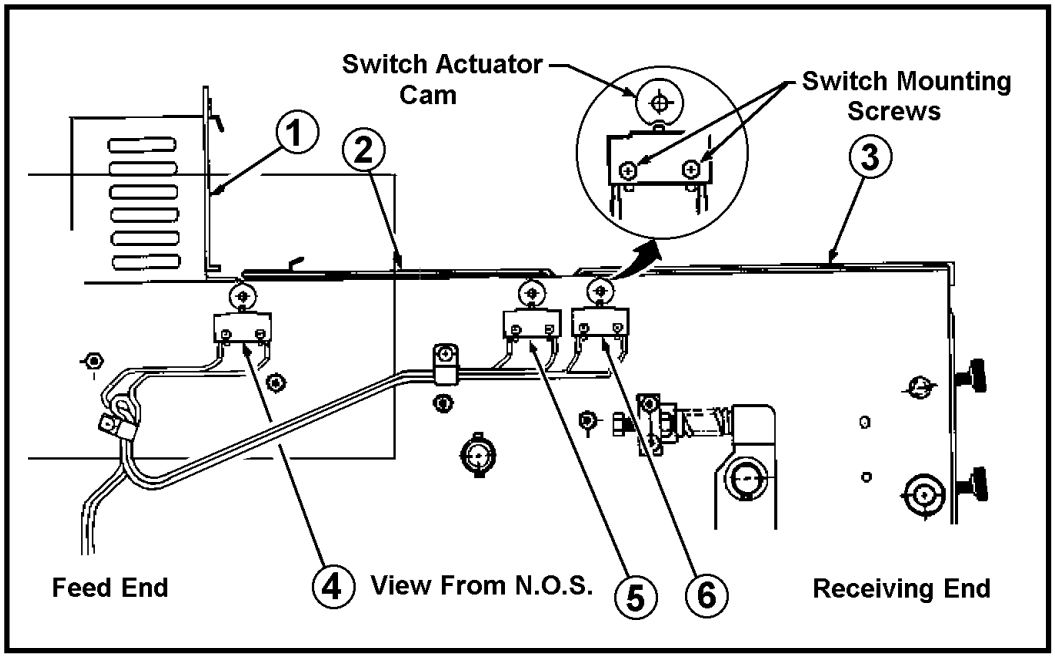


FIGURE 5-48

NOTE:

All retaining screws used to hold the safety switches in place are pre-coated with a thread-locking material to prevent slippage once the switches are properly adjusted. This is a regulatory agency requirement. If these screws are removed for switch replacement, newly-coated screws must be installed to maintain the integrity of the locking material.

Safety Guard System Test

Once all the safety guards have been adjusted, test them as follows:

1. If the GUARD RESET button is lit, make sure all the guards are closed and push the GUARD RESET button. The light shall go out.
2. Lift the Chain Delivery End Guard. The Chain Delivery LED indicator and Guard Reset light shall come on. Close the guard. The LED shall go out. Push the GUARD RESET button. The Reset Light shall go out. Flip back the Chain Delivery Front Guard and check it the same way.
3. Lift up the Ink Guard. The Ink LED and Guard Reset Light shall come on. Close the guard, and the LED will go off. Push the GUARD RESET button to turn off the Reset Light.
4. Lift up the Aquamatic Guard. The Aquamatic LED and Guard Reset Light shall come on. Close the guard, and the LED will go off. Push the GUARD RESET button to turn off the Reset Light.
5. Flip back the Blanket Cylinder Guard. The Blanket Cylinder LED and Guard Reset Light shall come on. Close the guard, and the LED will go off. Push the GUARD RESET button to turn off the Reset Light.

NOTE:

If the Guard is not closed, pushing the Guard Reset will not change display and Guard conditions.

6. Depress the Drive Button On the control panel.
7. Lift the Chain Delivery Guard. The Motor shall stop, the Guard Reset Light and LED shall come ON. Close guard. Only the indicator LED shall go OFF. The Motor shall not start. Press the Guard Reset Button. The light will go out.
8. Lift up all guards one after another and watch that the corresponding LED indicators are turned ON.
9. Close all guards. Push the Guard Reset. All lights OFF.

AQUAMATIC DUCTOR ROLLER

To assure uniform distribution of fountain solution and copy quality, the Aquamatic Unit must be properly adjusted.

NOTE:

The Form Rollers must be adjusted before doing this adjustment.

1. Position the Operation Control Lever (1) in NEUTRAL. Place the Ink Form Rollers (2) in the ON position, the Aquamatic Control Lever (3) in the OFF position, the Aquamatic Night Latch (4) in the ON position and the Aquamatic Lockout Latch (5) in the MANUAL position. (Figure 5-49)
2. Turn the Handwheel until the Ductor Operating Levers (6) nave traveled as far as they can toward the Aquamatic Oscillator (7). Adjust the eccentric screws (8) on the Ductor Operating Levers (6) by turning the screws and trucks up on both sides for a 1/64" (.40mm) gap between the Aquamatic Ductor Roller (9) and the Aquamatic Oscillator (7) across the entire length.
3. Move the Aquamatic Control Lever (3) to approximately one o' clock position. Position the Operation Control Lever (1) to INK. Turn the Handwheel until the Aquamatic Ductor Roller (9) just separates from the Aquamatic Oscillator Roller (7).

NOTE:

At this point it is extremely important that the Form Roller is on the Cylinder surface and not in the open area of the Cylinder. Move the Handwheel again, if necessary, to obtain the proper relation.

4. Move the Aquamatic Night Lever (5) and place a one inch strip of 20 lb. paper between the Ductor and Oscillator Roller at each end, but not over the edges of the rollers. Lower the Ductor Roller in contact with the paper strips and the Oscillator by moving the Aquamatic Night Latch Lever (4) to the ON position. Check for an even pull on each side. If the drag is not even, adjust either eccentric on the Ductor Operating Levers for an even feel. Recheck the adjustment. Turn the Aquamatic Control Lever (3) to the OFF position. Recheck the 1/64" (.40mm) gap between the Aquamatic Ductor and Oscillator Rollers. Return the Operator Control Lever to NEUTRAL.

⚠ CAUTION:

The proper separation must exist between the Aquamatic Ductor Roller and the Oscillator when the Aquamatic Control Lever is in the OFF position. If the separation is not sufficient, the Ductor Roller will contact the Oscillator and deliver unwanted solution into the system. If the gap is too great you will be limiting the operating range of the Fountain Solution Delivery.

NOTE:

When the Upper Ink Form Roller Pressure Adjustment is made, the relation between the Aquamatic Oscillator and the Aquamatic Ductor Roller will change. The Aquamatic Adjustment should be rechecked and adjusted, as necessary.

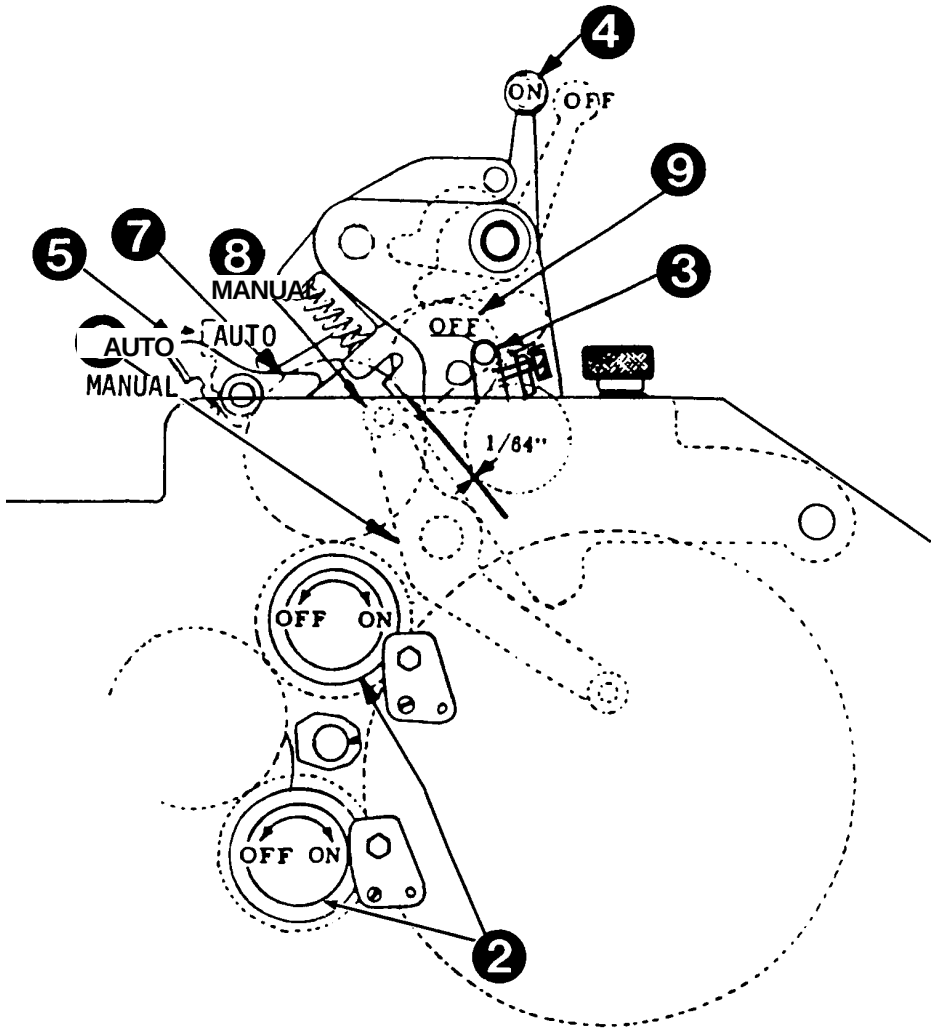
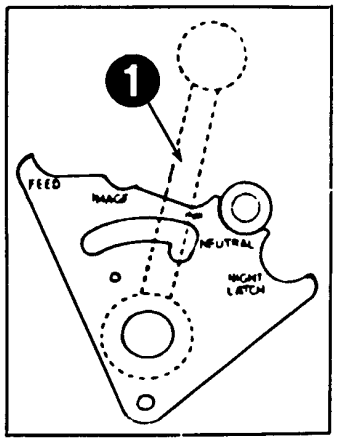


FIGURE 5-49



OPERATION CONTROL LEVER

AQUAMATIC DUCTOR LOCKOUT SYSTEM

When the Operation Control Lever is in NEUTRAL, the Aquamatic Ductor Roller must not be allowed to contact the Oscillator. Also the Aquamatic Lockout System must lockout the Ductor in NEUTRAL and release the Ductor in INK.

1. Attach a metal plate to the Master Cylinder.
2. Move the Operation Control Lever (1) to NEUTRAL.
3. Position the following: Form Roller Knobs (2) to ON, Aquamatic Night Latch Lever (3) to ON, Aquamatic Control Lever (4) to full ON position, and Aquamatic Lockout Lever (5) to AUTO position.
4. Loosen the two locking screws (6) on both sides of the machine on the Lockout Arms (7). (Figure 5-50)
5. Move the Aquamatic Control Lever to obtain a gap of 1/16" (1.6mm) between the Aquamatic Ductor (8) and the Aquamatic Oscillator (9).
6. Adjust the Lockout Arms (7) to butt against the ears of the Ductor Roller Levers (10).
7. Tighten the locking screws (6) on both sides.
8. Loosen the set screw (11) in the eccentric collar (12) on the Form Roller Separating Shaft and set the high of the eccentric in the upper range and tighten screw.
9. Move the Operation Control Lever (1) back and forth through the INK and NEUTRAL positions while turning the Handwheel and observing the release and lockout action of the Aquamatic Ductor Lockout. Test the machine under power also to be sure the Lockout Arms will lockout and release under all operating conditions. Rotate the Eccentric Collar (12) as necessary to achieve proper lockout and release and/or refine adjustment to lockout.
10. Check to see if the Lockout Arms raise and move out of engagement with the ears of the Ductor Roller Levers (10) on both sides of the machine when the Operation Control Lever is moved from NEUTRAL to INK position.

NOTE:

When the Operation Control Lever is moved from INK to NEUTRAL position, the Lockout Arms must drop and be in position to engage the ears of the Ductor Roller Levers keeping the Ductor Roller out of contact with the Aquamatic Oscillator.

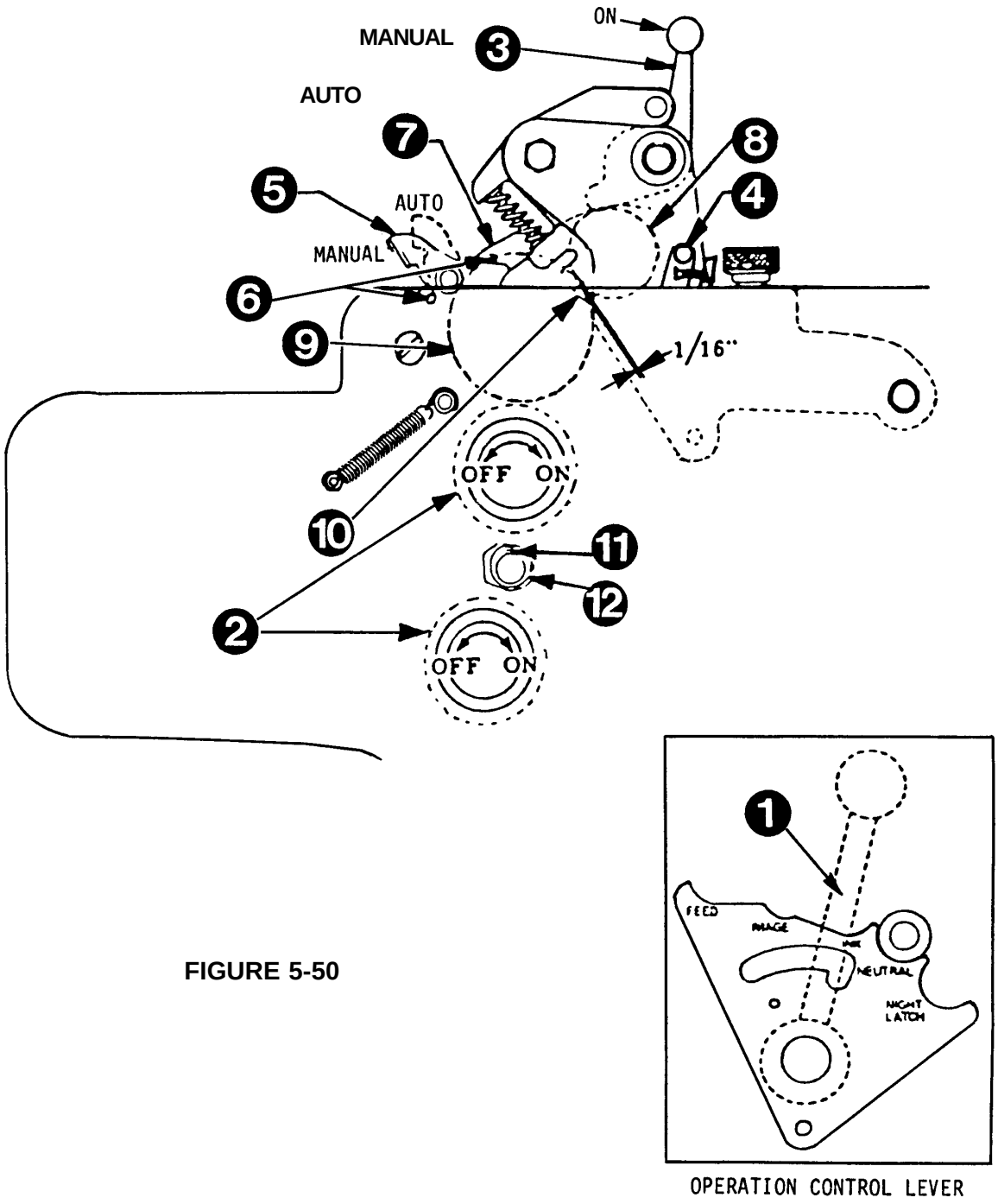


FIGURE 5-50

OPERATION CONTROL LEVER

NOTES

SECTION 6

MAINTENANCE AND LUBRICATION INSTRUCTIONS

ABDICK

MAINTENANCE AGREEMENT CALL PROCEDURE

1. Contact the customer for an appointment.
2. Upon arrival, determine if the operator has any problems with the equipment.
3. Remove the operating controls and the upper side covers from the Duplicator Unit. Replace the operating controls as needed.
4. Clean and inspect the ink rollers. Deglaze, desensitize, and condition as needed.
5. Clean and inspect the Aquamatic rollers.
6. Clean the side frames, tie bars, and all accessible surfaces and moving parts.
7. Clean all gears to remove any foreign matter between the gear teeth.
8. Clean and etch the Master and Impression Cylinders.
9. Check all parts for wear, paying particular attention to gears, levers, trucks, cams, springs, bearings, and other moving parts. Replace as needed.

NOTE:

All Parts and Rollers should be replaced as needed. They should NOT continue to be used until trouble develops or damage is caused to other parts. When approval to replace parts cannot be obtained, the part numbers and date should be recorded on the Service Invoice and the Call Card before being signed by the authorized person.

10. Lubricate the machine (see next section: "Lubrication Instructions").

⚠ CAUTION:

The Vacuum Pump is an oil-less type which needs no lubrication. Do not fill reservoir bottle with oil as this could damage the pump motor.

11. Clean the bottles and filters.
12. Clean the Drive Motor. Check the brushes for wear at least once every six months under normal usage, more often if the machine is heavily used.

NOTE:

The Direct Drive Motor has sealed bearings which need no lubrication.

13. Clean the upper and lower phototransistors in the Chain Delivery. Remove all paper lint or dry powder spray with a cotton swab.
14. Check all adjustments. Correct as needed.
15. Reassemble the side covers, controls, etc.
16. Run some test copies. Retain a sample.
17. Make a final inspection of the equipment and the general area.
18. Complete the Service Invoice and present it to the person authorized to sign it.
19. Remind the customer to check if they are running low on supplies. Ask if you may place an order to replenish their stock.
20. Keep your Sales Department informed of competitive supplies being used, new applications developing, and when the equipment should be replaced.

LUBRICATION INSTRUCTIONS

When lubricating, pay particular attention to the oil holes, all sliding parts, and latching devices. Note that some lubrication points can be made accessible only by turning the handwheel manually until they are exposed.

NOTE:

Residue of paper, dust, ink and other foreign materials should always be removed from Gears, working Levers, Shafts, Trucks and mechanisms before new lubricants are applied. This will prevent undue wear caused by abrasive action from this residue material. Areas around or adjacent to lubricated parts and surfaces should also be free of dust and foreign material.

A. **Lubrication Intervals**

Initial lubrication is essential within the first 30 hours of operation. Regular lubrication should be performed every 30 days on machines that operate 30 to 49 hours per week.

B. **Lubricants**

Oils: A.B.Dick Action Precision Oil (P/N 191511)
or S.A.E. No. 20 non-detergent engine oil

S.A.E. No. 10 high detergent engine oil

Grease: Multilube “A” Lubriplate (P/N 195553)

C. **General Lubrication Instructions**

Follow these general guidelines when lubricating machines.

1. Cams and Trucks

   Cam surfaces should be cleaned and oiled lightly. Trucks should be inspected for wear and replaced if necessary. Trucks must be oiled sparingly, making certain the oil reaches the inside bearing surfaces. Check to see that the trucks rotate freely after lubricating.

2. Springs and Spring Rods (Except Support Arm Springs)

   Springs and spring rods should be greased lightly. Before greasing springs and spring rods, the existing lubricant must be removed. When applying new grease, use it sparingly and only at the hook ends of the spring, NOT ON THE BODY OF THE SPRING.

3. Support Arm Springs

   Lightly grease the entire spring.

4. Gears

   All gears should be lubricated using Multilube “A” Lubriplate. Care should be taken to keep gears clean and free of all abrasives.

5. Drive Motor

   The drive motor has sealed bearings and does not need lubrication.

6. Vacuum System

   The vacuum pump is an oil-less type and does not need lubrication.

7. Levers and Links

   Use Multilube “A” Lubriplate sparingly at the following points on levers and links: slots, points of contact between levers, and points of contact between levers and studs. Use oil at the pivot points of levers and links.

8. Shafts and Rollers

   Oil all shaft and roller bearings inside and/or outside the operator and non-operator side frames.

9. Table Raising Assembly

   Oil between the adjusting sprockets and frame, oil the four trucks on the table, grease the chains and channels.

10. Master Cylinder

    Head clamp: oil hinge and adjustment screws Tail clamp: oil hinge pins and lock screws

11. Solenoids

    Oil the related linkages.

SECTION 7

SCHEMATICS

PART NO. 403406 SHT 1 OF 8

403443 FILTER ASM.

J/P10

L1 60 uH 10AMPS

L2 60 uH 10AMPS

FL1 EMI FILTER

C1 5uF 600V

LINE

BRN

BLU

GRN/YEL

BLK

BLK/WHT

S1 MAIN POWER

TS1

TS4

CB1

CB2

SEE BELOW FOR LINE VOLTAGE CONNECTIONS

TRANSFORMER SHOWN FOR 230VAC INPUT

RED 120V

BRN 110V

BLU 100V

BLK 0V

RED/WHT 120V

BRN/WHT 110V

BLU/WHT 100V

BLK/WHT 0V

WHT

GRY

115VAC

VIO

ORG

ORG/WHT

VIO/WHT

CB7

CB8

J/P30

100 WATT MAX WORK LAMP

WORK LAMP SHOWN FOR 115VAC OPERATION

CB3

CB4

CB5

CB6

P32

DRIVE MOTOR SC1

SEE SHT 7 OF 8

J20

PUMP MOTOR B2

K8

4B

3T

1B

1T

3B

2B

4T

2T

P/J13

P/J12

FL2

PS1 +5V

MICROPROCESSOR & INTERFACE PCB ASSM. 400700

TB1

SSRPCB

PCB ASM. ASM. 403425

P14

P15

J1

J2

VOLTAGE MON. SHT 7B2

AIRTECH SPRAY SHT 3C4

EE POT SHT 4B2

VOLTAGE MON. SHT 7A3

AIRTECH SPRAY SHT 3B4

EE POT SHT 4C2

NC

J102

J107

TS1 PRIMARY HOOKUP

200VAC 50/60HZ

220VAC 50HZ

230VAC 50/60HZ

240VAC 50HZ

FACTORY WIRED

230VAC WORK LAMP HOOKUP

NOTES: ** JUMPER WIRE USED

403404	0	REV.	CHANGE	DATE / BY / CH
REFERENCE		THIS IS A CAD GENERATED DRAWING. CHANGES MUST BE MADE ON CAD SYSTEM.		
ASM. NO.	QUAN.			
MODEL 9970/D				
INITIAL USAGE				

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TOL. NOT SPEC'D: .XXX ±.005 .XX ±.010 .X ±.015 ANGLES ±2° SCALE NONE

MATERIAL: REF. 9970/D SCHEMATICS

FINISH / HT. TREAT

NAME: SCHEMATIC ELECTRICAL CONTROL

ACAD R12

ABDICK

5700 W. TOUHY AVE., NILES, ILLINOIS 60714

PART NO. 403406 SHT 1 OF 8 REV. 3

CADFORM DFORM-11-92

PART NO. 403406 SHT 2 OF 8

MICROPRECESSOR & INTERFACE
PCB ASM. 400700

DECODER PCB
ASSY 8156

300 (GND) SHT 1B5 — BLU/WHT
210 (+5V) SHT 1B5 — BLU

TB1 D3 1N4001 D4 1N4001

C32 15,000 MFD @6.3V GND
R22 33 OHM
DRIVE INHIBIT

J4 2 300 BLU/WHT
SAFETY BUFFER RELAY K4 14 13 D1 1N4002
1 229 BLU

J3 38 37 35 36 — J6 20 18 — J5 +5V 20 GND 5
J203 P203 P503 J503 J515

272 BLU K10 11 7 271 BLU

A5 LCD DISPLAY P514 1 14 J514
A6 MEMBRANE SWITCH PANEL P512 1 16 J512

210 BLU
300 BLU/WHT
14 K9 13 D1 1N4002
GS BUFFER RELAY
228 BLU
P205 22 20 21

S25 GRD RST
238 8
245 7
236 6
300 3
DS17 RST
R30 330
D1 1N5908
K1 3 4 5
K1 8 6
R2 2K
D15 1N5908
K1 1 2
WH
31

J503 — J518 4 5 6 3 2 1 8 7
P518
243 ORG 241 ORG 239 ORG 237 ORG 300 ORG 234 BLU 233 BLU 235 BLU
P57 9 4 8 19 10 11 12 13 14 15 16 17 18 20
NC

D6 D7 D8 D9

MEMBRANE GND.
GRN/YEL
FRAME GND.

S16 GS DRIVE SWITCH
PART OF 401328 CONTROL PANEL ASM.
*S28B SPEED UP
*S30B SPEED DOWN
P38 1 2
J37 3 4 2 1
228 BLU 210 BLU 228 BLU 210 BLU 228 BLU 210 BLU

237 ORG 239 ORG 241 ORG
J41 3 2 1 4 NC
BLK GRN RED WHT
S23 INK SYS GUARD
S22 AQUA. SYS. GUARD
SUPER AQUAMATIC MODELS ONLY

P46 2 1
CHAIN DEL. GUARDS
S24 NC C
S29 NC C
S17 C NC
231 ORG 242 ORG

S31 DISENGAGING HANDWHEEL SWITCH
S21 BLANKET CYL. 244 ORG
P53 1 3 4 2 N.C.
J27 1 3 4 2 N.C.
S19 FEED 233 BLU
S18 PROOF 234 BLU 235 BLU

3 2 4 1 J63 N.C.
241 ORG 239 ORG 237 ORG
TO DAMPENER
TO SHT. 6
TO SHT. 6
TO SHT. 6

NOTES: 1. SEE SHT. 4 OF 8 FOR S28A & S30A

ACAD R12

403404	0
REFERENCE	
ASM. NO.	QUAL
MODEL 9970/D	
INITIAL USAGE	

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MATERIAL: REF. 9970/D SCHEMATICS

FINISH/HT. TREAT

NAME: SCHEMATIC ELECTRICAL CONTROL

ABDICK
5700 W. TOUHY AVE., NILES, ILLINOIS 60714

PART NO. 403406 SHT 2 OF 8 REV.

CADFORM DFORM-11-92

PART NO. 403406 SHT 3 OF 8

DECODER PCB ASM. 8156

J503 P503 J303 P303 J203 P203 P3 J3

MICROPROCESSOR & INTERFACE PCB ASM. 400700

J5: 1 CLOCK, 2 GND, 3 SYNC, 22 +5VDC, 24 PULL UP, 26 PAPER DET.IN, 25 GND, 8 NC, 4 GND, 19 CD FULL, 17 JAM DET. OUT, 15 JAM DET. OUT, 11 JAM DET. IN, 9 GND, 12 DBLS DET., 6 GND, 10 LOW PAPER, 7 GND, 13 ALARM OUT, 14 +5VDC

P5 / J205 / P205: 1 2 3 4 27 26 25 24 23 17 16 15 18 19 12 11 10 9 5 6 8 7 13 14

210-P15-2 SHT. 1B7

300-P15-9 SHT. 1A7

213 BLU, 215 BLU, 300 BLU/WHT, 210 BLU — P44 3 2 4 1 — CLOCK/SYNC PCB ASSY 17742

232 BLU, 225 BLU, 300 BLU/WHT — P40 1 2 3 — RED, WHT — BLK, GRN — PAPER DETECT A1

300 BLU/WHT, 210 BLU — P46 10 9 — P47 2 1 — (−) (+) AIRTECH POWDER SPRAY ATTACHMENT OPTIONAL

NC, NC, NC — 13 14 15

300 BLU/WHT, 227 BLU/WHT — J45 6 5 — 2 1 — S26 CHAIN DELIVERY FULL SWTCH

226 BLU, 224 BLU — J43 12 11 — 2 1 — BLK, RED — A3

221 BLU/WHT, 300 BLU/WHT — P42 7 8 — 1 2 — RED, BLK — JAM DETECT A4

223 BLU/WHT, 300 BLU/WHT — NO C — S11 DOUBLES DETECT

219 BLU/WHT, 300 BLU/WHT — P39 2 1 — BLU/WHT BLU/WHT — *S12 LOW PAPER

*SHOWN IN AN ACTIVATED POSITION

220 BLU, 222 BLU — P62 1 2 — P36 2 1 — SHEET 6 (P55-5) REF. — SHEET 6 (P55-4) REF.

DS16 ALARM FOR SUPER AQUAMATIC MODEL ONLY

PART NO. 403406 SHT 3 OF 8

ACAD R12

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REFERENCE			
ASM. NO.	QUAN.		
MODEL 9970/D			
INITIAL USAGE			

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MATERIAL: REF. 9970/D SCHEMATICS

FINISH/HT. TREAT

NAME: SCHEMATIC ELECTRICAL CONTROL

ABDICK

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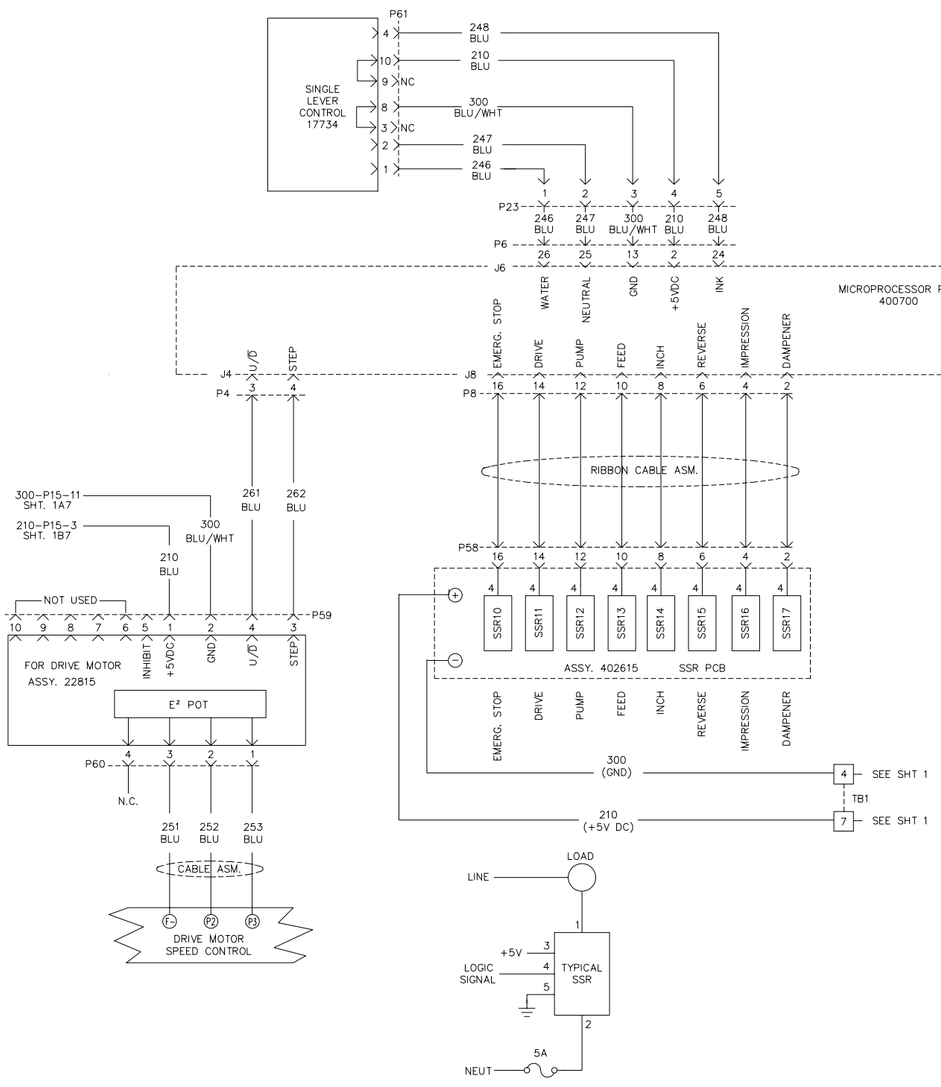
PART NO. 403406 SHT 3 OF 8 REV.

CADFORM DFORM-11-92



NOTES: 1. *SEE SHT. 7 OF 8 FOR S28B & S30B.

403404	0	THIS IS A CAD GENERATED DRAWING. CHANGES MUST BE MADE ON CAD SYSTEM	
REFERENCE			
ASM. NO.	QUAN.		
MODEL 9970/D			
INITIAL USAGE			

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MATERIAL: REF. 9970/D SCHEMATICS

FINISH/HT. TREAT:

NAME: SCHEMATIC ELECTRICAL CONTROL

ACAD R12

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PART NO. 403406 SHT 4 OF 8 REV.

CADFORM DFORM-11-92

PART NO. 403406 SHT 5 OF 8

J107 — 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 — J107

SEE SHT. 7D1
SEE SHT. 7D5
SEE SHT. 1B3
SEE SHT. 1D5
SEE SHT. 7D5

107 RED — 1 — J24 — 3 — 107 RED — 17 — 107 RED

107 RED — FEED SOL (L1)
107 RED — IMPRESSION SOL (L2)
107 BRN

J55
1 ⟨ TO DAMPENER SHEET 6
3 ⟨ TO DAMPENER SHEET 6
2 ⟨ TO DAMPENER SHEET 6
6 ⟨ TO DAMPENER SHEET 6
4 ⟨ N.C.
5 ⟨ N.C.

PUMP RELAY (K8): 0 / 1
R1 2K

124 RED/WHT
132 RED/WHT
102 YELLOW
GND GREEN

116 RED/WHT
123 ORANGE

J24: 2 — 4 — 18 — 19 — 20

124 RED/WHT
132 RED/WHT
123 RED/WHT
GND GRN/YEL

J26: 4 — 3 — 7 — 8

7 — 5 — 13 — 15

FEED 1 — SSR13
PUMP 1 — SSR12
IMP 1 — SSR16
DAMPENER 1 — SSR17
2 — 2 — 2 — 2
SSR PCB No.1

8 — 6 — 14 — 16

SEE SHT. 1B3
SEE SHT. 1D5

J26: 9

102 RED/WHT
102 RED/WHT

J102 — 1 3 5 6 7 8 9 10 11 12 13 14 2 15 16 17 18 19 20 21 22 23 4 24 — J102

403404 | 0
REFERENCE
ASM. NO. | QUAN.
MODEL 9970/D
INITIAL USAGE

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MATERIAL: REF. 9970/D SCHEMATICS
FINISH / HT. TREAT
NAME: SCHEMATIC ELECTRICAL CONTROL

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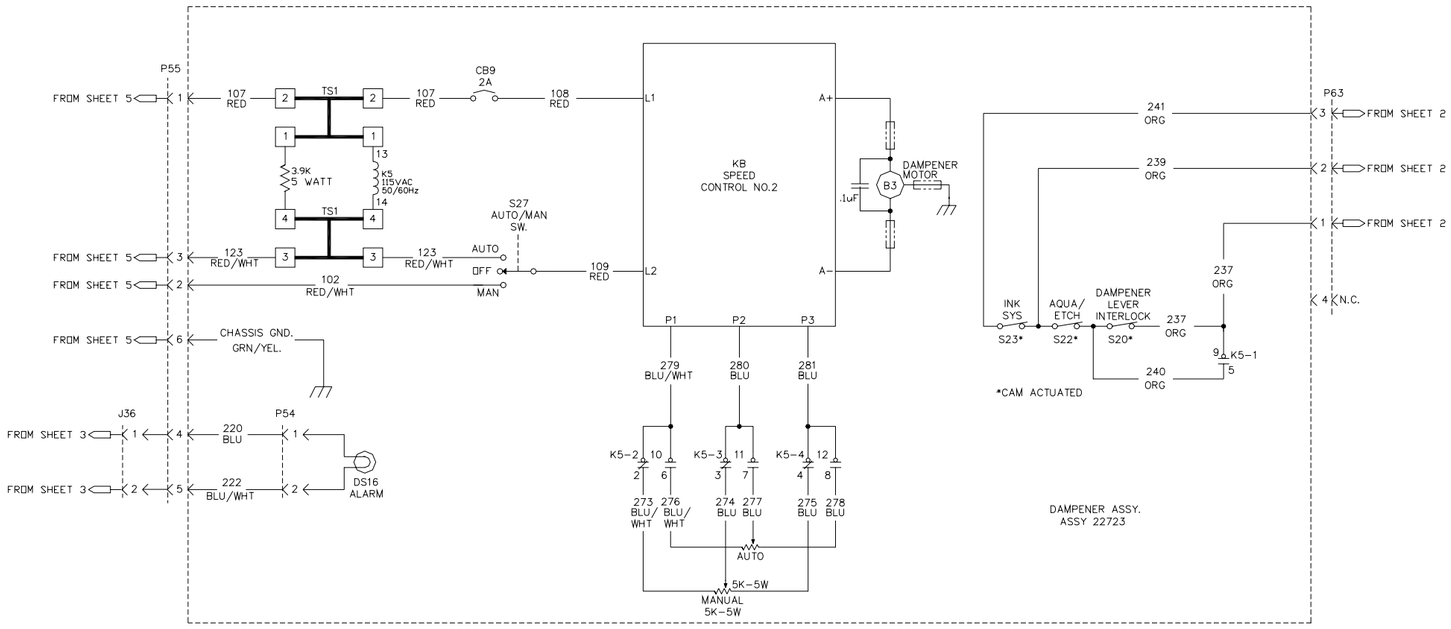
PART NO. 403406 SHT 5 OF 8 REV. 2

CADFORM DFORM-11-92

PART NO. 403406 SHT 5 OF 8

PART NO. 403406 SHT 6 OF 8



PART NO. 403406 SHT 6 OF 8

403404	0	THIS IS A CAD GENERATED DRAWING. CHANGES MUST BE MADE ON CAD SYSTEM.
REFERENCE		
ASM. NO.	QUAN.	
MODEL 9970/D		
INITIAL USAGE		

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MATERIAL: REF. 9970/D SCHEMATICS

FINISH / HT. TREAT

NAME: SCHEMATIC ELECTRICAL CONTROL

ACAD R12

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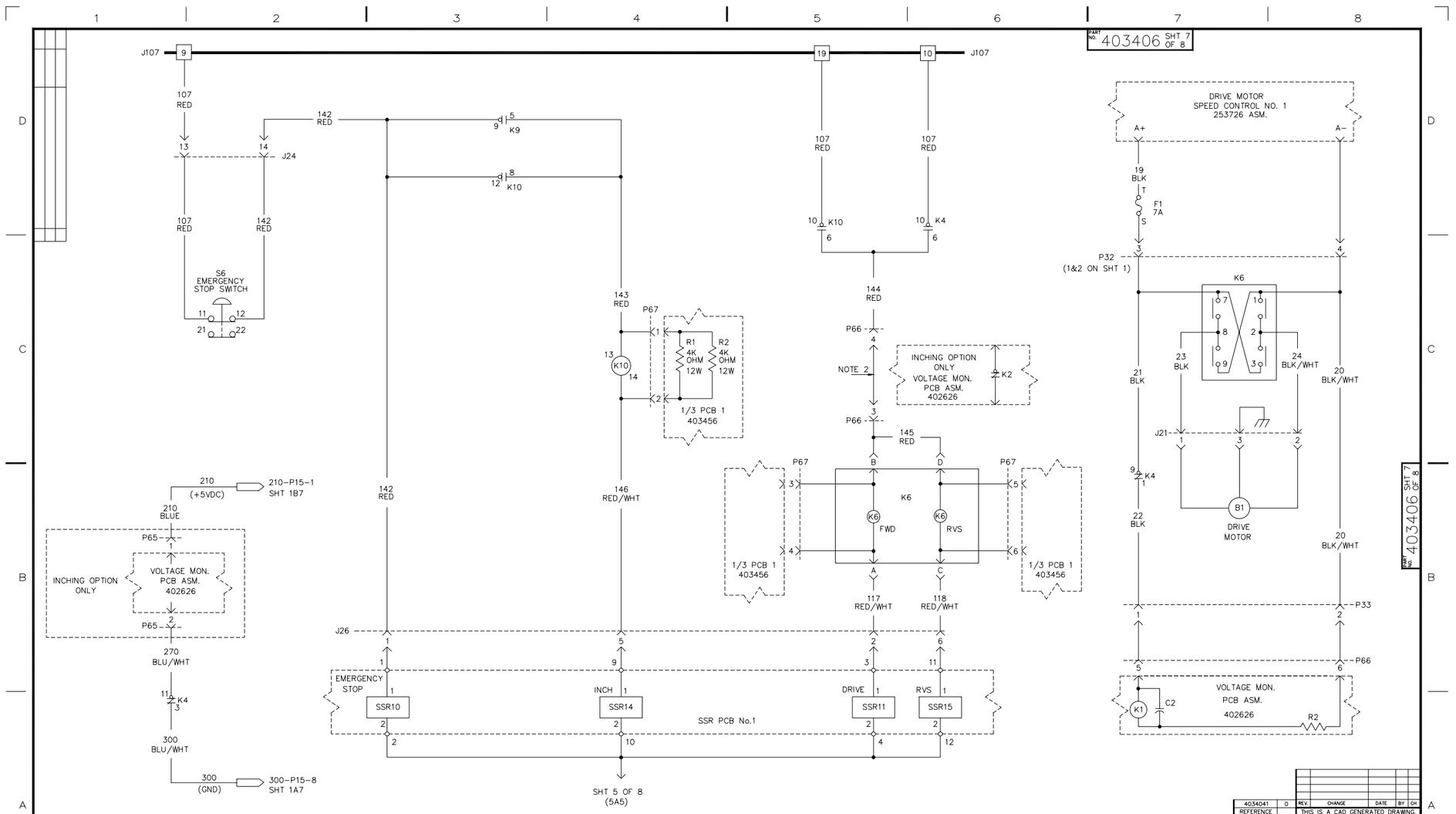
5700 W. TOUHY AVE., CHICAGO, ILLINOIS 60648

PART NO. 403406 SHT 6 OF 8 REV.

CADFORM DFORM-11-92



NOTES: 1. K4 SAFETY BUFFER RELAY – ENERGIZED WHEN ALL GUARD COVERS ARE CLOSED.

2. P66–3 AND P66–4 JUMPERED WHEN INCHING OPTION IS NOT PRESENT.

ACAD R12

4034041	0	REV.	CHANGE	DATE	BY CH
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ASM. NO.	QUAN.				
MODEL 9970/D					
INITIAL USAGE					

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TOL. NOT SPEC'D: .XXX ±.005 .XX ±.010 .X ±.015 ANGLES ±2° SCALE NONE

MATERIAL: REF. 9970/D SCHEMATICS

FINISH/HT. TREAT

NAME: SCHEMATIC ELECTRICAL CONTROL

ABDICK
5700 W. TOUHY AVE., NILES, ILLINOIS 60714

PART NO. 403406 SHT 7 OF 8 REV. 3

CADFORM DFORM-11-92

DESIG.	DESCRIPTION	PART NUMBER	*LOCATION
A1	PPR IN SNS	9532	3B3
A2			
A3	JAM DETECT	11507	3B6
A4	JAM DETECT	11506	3B6
A5	LC DISPLAY	25359	2C5
A6	MEMBRANE	22753	2C6
B1	DRIVE MOT.	25350	7B7
B2	PUMP MOT.	25352	1C8
B3	DAMP. MOT.	16262	6C5
CB1	XFMR INPUT	253542	1D3
CB2	XFMR INPUT	253542	1C3
CB3	DRIVE MOT.	250051	1D6
CB4	DRIVE MOT.	250051	1C6
CB5	PUMP MOT.	250051	1D7
CB6	PUMP MOT.	250051	1C7
CB7	XFMR OUTPUT	253543	1C5
CB8	WORK LAMP	254698	1D5
CB9	DAMPENER	253713	6C3
DS16	ALARM	253562 (LNS) 253563 (LMP)	3B8
DS17	RST	253551	2B1
F1	DRV. MOT.ASM.	402844	7D7
FL1	EMI FILTER	253619	1D2
FL2	FILTER	XXXXXX	1B4
L1	FEED SOL.	253578	5D5
L2	IMP. SOL.	253375	5D6
L3	CD STAC. SOL.	253375	5C3
PCB	uPROCESSOR	400700	1B5,2D3,3D5
PCB	DECODER	8156	2B5,3D1
PCB	LOAD RESISTOR	403456	7B5
PCB	CLOCK/SYNC	17742	3B2
PCB	SNGL. LEVER	17734	4D4
PCB	DRIVE E2POT	22815	4B3
PS1	+5V DC PS	253726	1B4
PS2	DISTRB. 5DCV	403425	1B6
SC1	MACHINE	253726	1C7,7D7
SC2	DAMPENER	83706	6C5

DESIG	DESCRIPTION	PART NUMBER	*LOCATION
S1	MAIN PWR	253005	1D2
S6	EMER STOP	253475	7C1
S11	DBLS DET	253025	3B7
S12	LOW PPR	25366	3B7
S13	PAPER SENS.	253545	4B8
S16	GS DRIVE	402630	2A6
S18	PROOF	253002	2A5
S19	FEED	253002	2A5
S20	DAMPENER INH	253211	6B6
S21	BLKT CYL	253211	2A4
S22	AQUA/ETCH	253211	2A1
S23	INK SYS	253211	2A1
S24	CHAIN DEL.	253211	2A3
S25	GRD RST	253551	2C1
S26	CD FULL	25366	3B5
S27	DAMPENER	253511	6C3
S28	MACHINE SPD UP	402637	4B7,4B7
S29	CHAIN DEL.	253211	2A2
S30	MACHINE SPD DWN	402637	4A7,4B3
S31	DIS. HANDWHE.	253211	2B4
SSR10	EMER. STOP	253492	7A2
SSR11	DRIVE	253491	7A5
SSR12	PUMP	253491	5B6
SSR13	FEED	253491	5B5
SSR14	INCH	253491	7A4
SSR15	REVERSE	253491	7A6
SSR16	IMPRESSION	253491	5B6
SSR17	DAMPENER	254677	5B7
T1	TRANSFORMER	401678	1D4

DESIG.	DESCRIPTION	PART NUMBER	COIL	PL1	PL2	PL3	PL4
K4	SFTY BFR	25481	2D8	7B6		7A1	5C2
K5	DAMPENER	253467	6C3	6B7	6C4	6C5	6C5
K6	DRIVE MOT.	254285	7B5	7C7	7C7		
K8	PUMP MOT.	254559	5C6	1D7	1C7		
K9	GS DRIVE	25481	2C7	7D3			
K10	INCH	253468	7C4	7D5			7D3

DESCRIPTION	PART NUMBER
HARNESS-LOW VOLTAGE	403451
HARNESS-115VAC	403450
HARNESS-CHAIN DELIVERY	403442

* LOCATION: SHEET, ROW, COLUMN

PART NO. 403406 SHT 8 OF 8

ACAD R12

403404	0	THIS IS A CAD GENERATED DRAWING. CHANGES MUST BE MADE ON CAD SYSTEM.	
REFERENCE			
ASM. NO.	QUAN.		
MODEL		REL. FOR PRODUCTION	6.10.96
INITIAL USAGE		REL. FOR T. D. & P.	

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MATERIAL: REF. 9970/D SCHEMATICS

FINISH/HT. TREAT

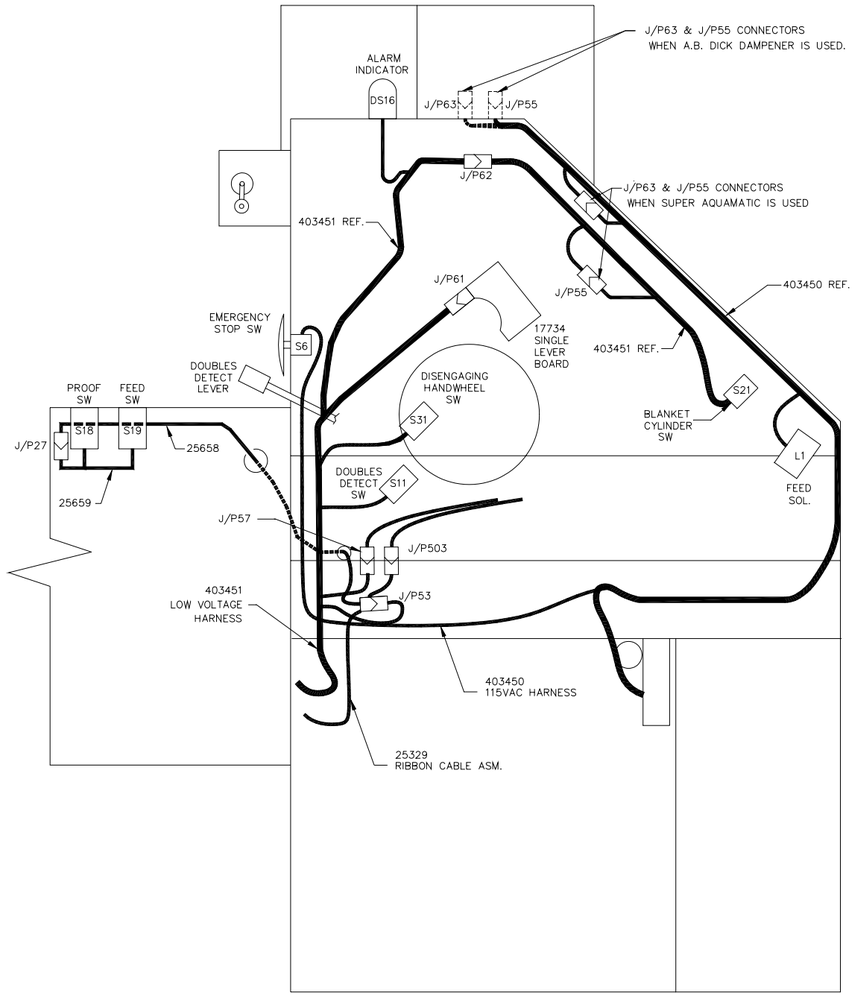
NAME: SCHEMATIC ELECTRICAL CONTROL

ABDICK®
5700 W. TOUHY AVE., NILES, ILLINOIS 60714-4690

PART NO. 403406 SHT 8 OF 8 REV. 3

CADFORM DFORM-5-90

PART NO. 403407 SHT 1 OF 4



PART NO. 403407 SHT 1 OF 4

REFERENCE	0	THIS IS A CAD GENERATED DRAWING. CHANGES MUST BE MADE ON CAD SYSTEM.	
ASM. NO.	QUAN.		
MODEL 9970			
INITIAL USAGE			

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MATERIAL | FINISH / HT. TREAT

NAME HARNESS MAP OPERATOR SIDE

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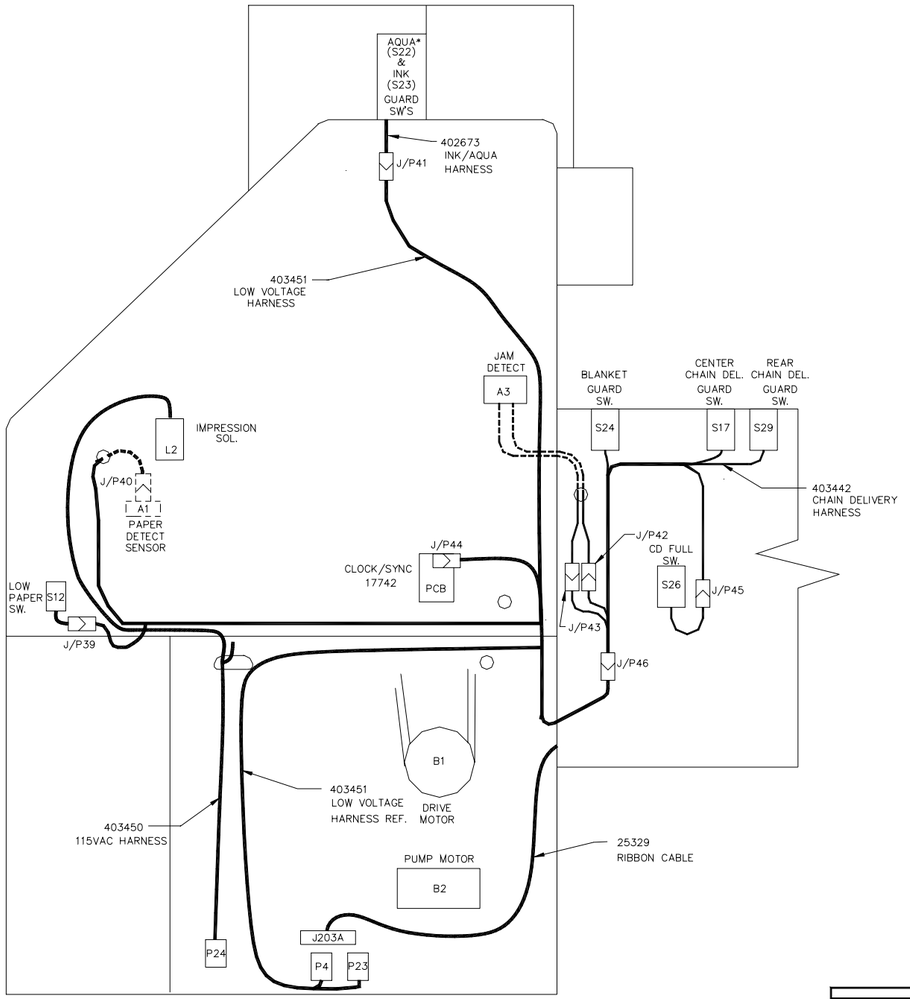
PART NO. 403407 SHT 1 OF 4 REV. 1

ACAD R12

CADFORM DFORM-5-90

PART NO. 403407 SHT 2 OF 4



* WHEN SUPER AQUAMATIC IS USED.

PART NO. 403407 SHT 2 OF 4

SIGNED CAD-DRAWING APPROVALS WILL APPEAR ONLY ON ORIGINAL ISSUE.		REFERENCE	0
TOL. NOT SPEC'D: .XXX ±.005 .XX ±.010 .X ±.015 ANGLES ±2°	SCALE NONE	ASM. NO.	QUAN.
MATERIAL		MODEL 9970	THIS IS A CAD GENERATED DRAWING. CHANGES MUST BE MADE ON CAD SYSTEM.
FINISH / HT. TREAT		INITIAL USAGE	6.19.96
NAME HARNESS MAP NONOPERATOR SIDE		ABDICK® 5700 W. TOUHY AVE., NILES, ILLINOIS 60714	
ACAD R12		PART NO. 403407 SHT 2 OF 4	REV. 1

CADFORM DFORM-5-90

PART NO. 403407 SHT 3 OF 4

403432 230VAC HARNESS

XFMR IN — CB1 — 2
XFMR IN — CB2 — 2
DRIVE MOTOR — CB3 — 2
DRIVE MOTOR — CB4 — 2
PUMP MOTOR — CB5 — 2
PUMP MOTOR — CB6 — 2
XFMR OUT — CB7 — 2
WORK LAMP — CB8 — 2
POWER — S1 — 4

B2 PUMP MOTOR — J/P20 — 2
B1 DRIVE MOTOR — J/P21 — 2
WORK LAMP — J/P30 — 2
115VAC OUTPUTS — J/P24 — 13
403431 115VAC HARNESS
LOW VOLTAGE CIRCUITS — J/P205 — 21
SENSORS (INPUTS) — J/P23 — 8

FL1 FILTER — 2
POWER CORD

DRIVE CONTACTOR (FWD/REV) — K6 — 6 / 4
INCH RELAY — K10 — 4 / 2
DRIVE MOT. SPEED CONTROL — 4 / 3
PUMP RELAY — K8 — 4 / 2
SAFETY BUFFER — K4 — 2 / 2
GS BUFFER RELAY — K9 — 2 / 2

J/P6 — 7
SSR PCB — 2

J/P12 — 2
FL2 FILTER — 2
J/P13 — 2
PS1 +5V — 2

TS1 TRANSFORMER — 1 / 2 / 3 / 6 — 1

TB1

403430 (DC LOGIC) — 26
MICROPROCESSOR & INTERFACE PCB ASM 400700 — J5 / J8 / J3 / J4 / J6 / J7
401210 — 16 — SSR PCB ASM
401209 — 40 — J/P203 — 25329 — 40 — J/P503 — TO CONTROL PANEL
403438 (J3 TO J6 & J7 HARNESS) — 7 / 3

PCB DRIVE E2POT BOARD — J1 — P1 — 4 / 4

PART NO. 403407 SHT 3 OF 4 REV. O

ACAD R12

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MATERIAL

FINISH/HT. TREAT

NAME HARNESS MAP CONTROL BOX

REFERENCE O
ASM. NO. DWN.

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MODEL 9970
INITIAL USAGE

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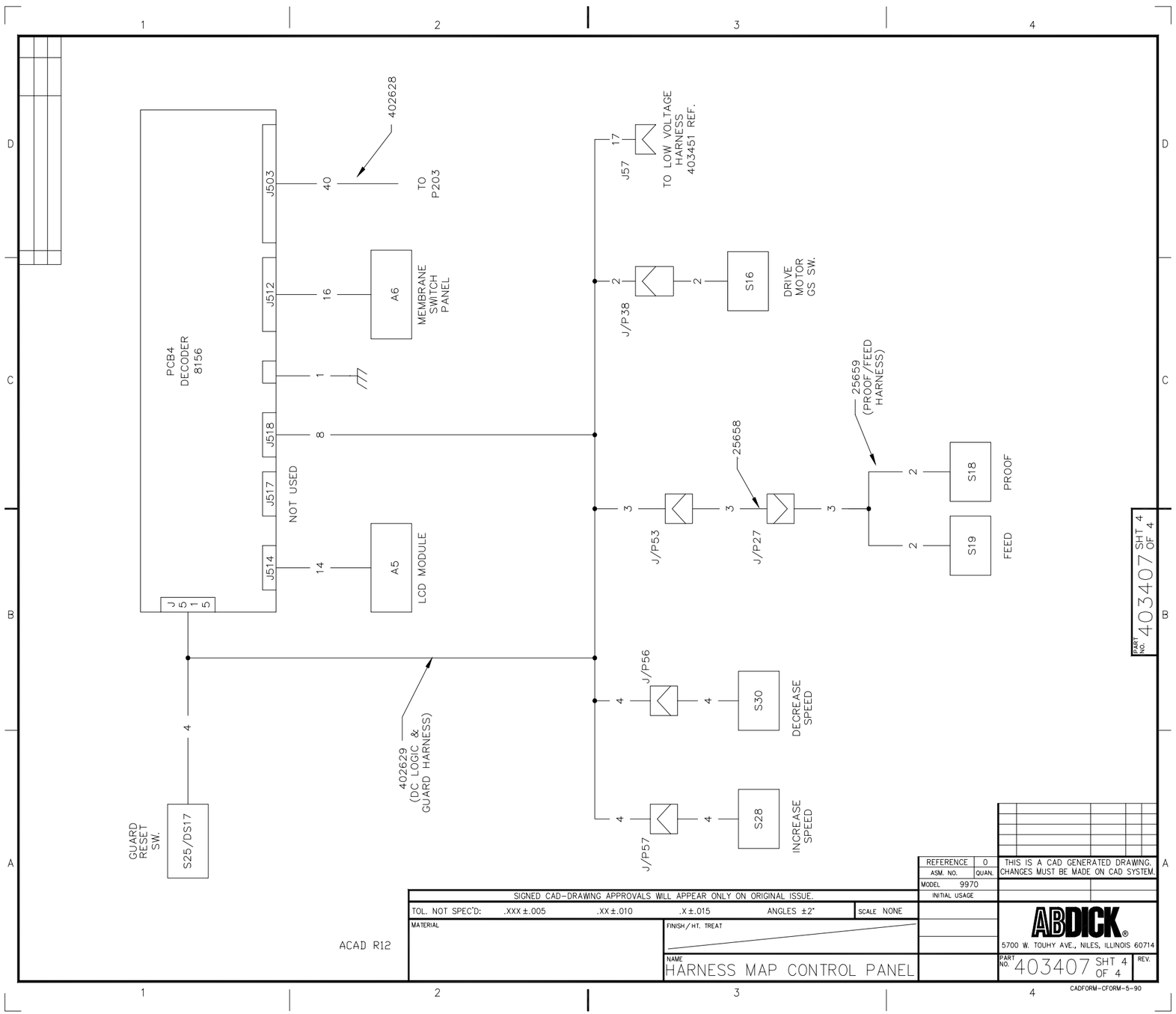
PART NO. 403407 SHT 3 OF 4 REV.

CADFORM DFORM-5-90


PCB4
DECODER
8156
J503
40
402628
TO
P203
J512
16
A6
MEMBRANE
SWITCH
PANEL
1
J518
8
J517
NOT USED
J514
14
A5
LCD MODULE
J515
4
GUARD
RESET
SW.
S25/DS17
402629
(DC LOGIC &
GUARD HARNESS)
J57
17
TO LOW VOLTAGE
HARNESS
403451 REF.
J/P38
2
2
S16
DRIVE
MOTOR
GS SW.
J/P53
3
3
J/P27
25658
3
25659
(PROOF/FEED
HARNESS)
2
S18
PROOF
2
S19
FEED
J/P56
4
4
S30
DECREASE
SPEED
J/P57
4
4
S28
INCREASE
SPEED
PART NO. 403407 SHT 4 OF 4
REFERENCE 0
ASM. NO. QUAN.
MODEL 9970
INITIAL USAGE
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TOL. NOT SPEC'D: .XXX ±.005 .XX ±.010 .X ±.015 ANGLES ±2°
SCALE NONE
MATERIAL
FINISH / HT. TREAT
ACAD R12
NAME
HARNESS MAP CONTROL PANEL
ABDICK®
5700 W. TOUHY AVE., NILES, ILLINOIS 60714
PART NO. 403407 SHT 4 OF 4
REV.
CADFORM-CFORM-5-90

A.B.Dick Company
Worldwide Headquarters
7400 Caldwell Ave.
Niles, Illinois 60714
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(847)-779-1900
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www.abdick.com